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ABSTRACT

This booklet provides activities to enrich the core of basic mathematics instruction in the intermediate grades. Several learning center ideas are presented throughout the book, with general suggestions for the teacher in planning for and managing learning centers. The use of contracts with students is also discussed. Bulletin board ideas are included, along with a variety of activities grouped by content: place value and numeration, addition/subtraction, multiplication/division, fractions/decimals/percent, geometry, measurement, and graphing/statistics/probability. (MNS)

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GOOD APPLE & MATH FUN

by

Jerry Aten

illustrated by Vanessa Booth

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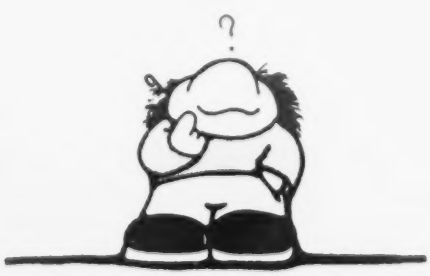


A MESSAGE TO THE READER

The whole plan of this book centers around the idea of providing students with a variety of learning options that will enrich the core of basic instruction they have already received. The main focus of these enrichment projects and activities lies within the heart of the learning center. There are several learning center ideas presented throughout the book that are offered as suggestions because they have been found to be successful in the classroom. Obviously, space and available resources will play the most important roles in determining the specific type of learning center you create.

When it gets down to the management of a classroom that uses the learning center approach, there must be some very positive and definite well-made plans on the part of the teacher. The planning and record-keeping must be done in such a way that will provide for an almost total individualization on the part of the students as well as minimum intervention on the part of the teacher.

To determine the type of activities and projects that will be stationed in the learning center, the teacher must first assess just what it is that she hopes to accomplish there. Is she *really* providing for a variety of ability levels? Are the tasks laid out *really* appropriate to the material she has presented to the class? Will those tasks that are assigned provide for a meaningful learning experience, or are they merely "busy work"?

Since many students may not be familiar with this type of learning environment, it is appropriate to spend some time with them explaining fully just *what* is expected of them and the types of behaviors that will not be tolerated.

A simple behavior agreement similar to the one found in this book can go a long way toward making a child realize the responsibilities he is taking on. The trick is to keep it simple to avoid confusion, but also to be very specific in just what it is that you want children to do.

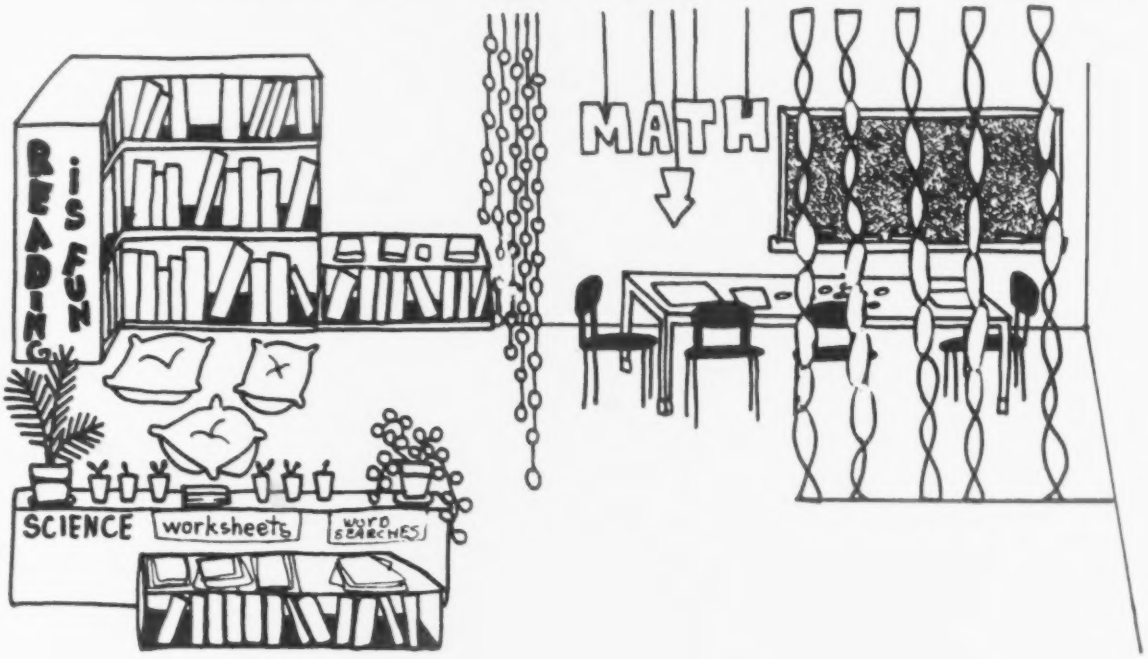
Once the children have recognized the behavior commitment they have made, it then becomes time to lay out before them the various options they have available and then to get a commitment from them on those specific tasks which they will choose to complete. Perhaps the best way to accomplish this is through an actual contractual arrangement with the student. There is an example of such a contract in this book as well as some helpful hints on how to handle contract work with students. The bottom line here is for the teacher to insist on children living up to the commitments they have made.

There are bulletin board ideas scattered throughout as well as a number of learning center suggestions. In addition, there are educational games and seatwork type activities (both for the individual and for small groups). There are also pages which contain four independent task cards each. To gain full benefit from the use of these cards, it is a good idea to cut them apart and laminate or cover them with Con-Tact paper to ensure their durability. It is also advisable to cover the game boards in the same manner. Finally, there are activities that involve students in real life problematic simulations (Main Street Math) that bring to children the reality of the importance of mathematics in everyday life.

That was really my main intention in writing this book. To be able to motivate kids to appreciate just how important mathematics is and will continue to be to them was the whole idea. If they have a little fun along the way...so much the better!

A WORD ABOUT LEARNING CENTERS

The whole idea of a learning center is not to replace the classroom teacher but to move children away from teacher-centered direction more toward independent study. Having a variety of materials, activities and projects also allows the student the opportunity for making a choice of something he wants to do rather than something the teacher has directed that he shall do.



Learning centers help to provide for the individual differences in children. Each child runs on a different track; and if we are going to get the very best from children, then we must provide them with learning activities that motivate them and cater to their needs. Pity the teacher who fails to recognize these differences in the needs of her children.

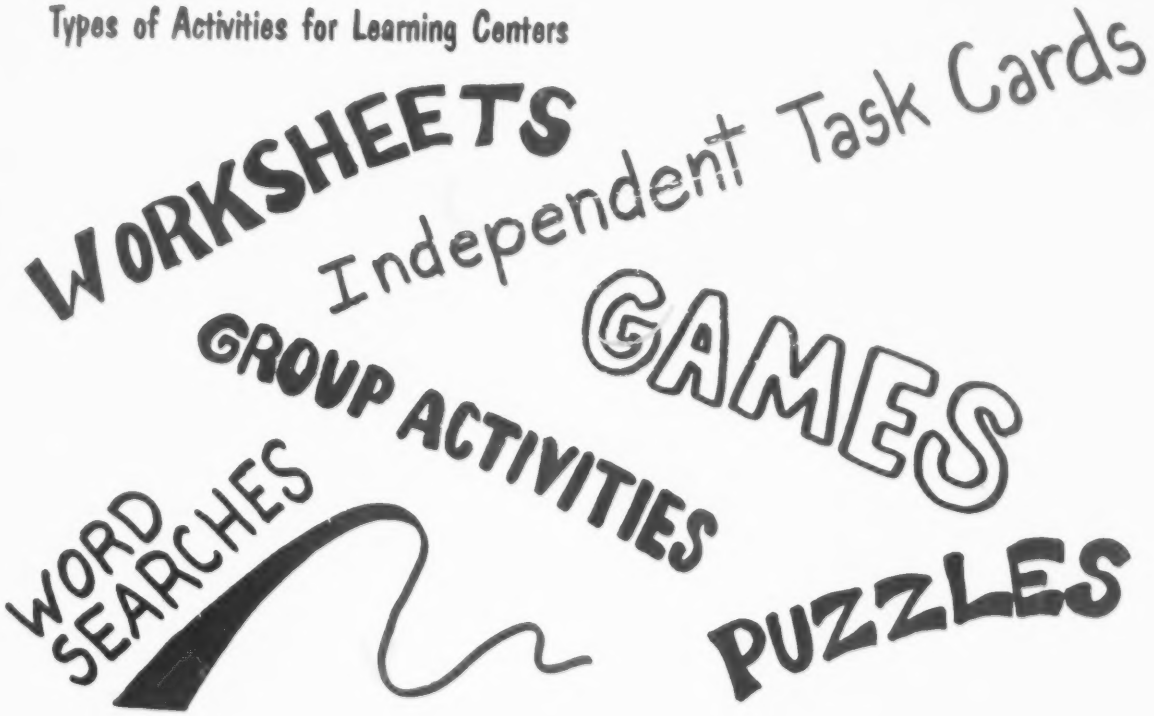
There is also the advantage in using the learning center approach to provide for a variety of study environments. While some projects and activities can be designed for individuals, others should be adapted to small group work. It is even advisable to have the entire class participate in certain projects. The interaction from such group involvement will vary, but there should be *something for everyone* when different arrangements are created for different students.

The materials you place in your learning centers should also be durable. Except for the consumable activitiy sheets, all other projects and activities should be either laminated or covered with Con-Tact paper to ensure durability. It's a good idea to use tagboard or heavy paper to add further life to the materials you choose. Remember that several children are going to handle them over a period of time.

Each center you make should be pretty much self-contained. The less moving about students have to do, the more they are going to become involved in the project at hand. Either a long or round table usually works quite well. If you don't have one available, another alternative is to use a bookcase. Some schools even have movable panels or study carrels, which can help to create the proper environment for learning center work. Be certain to include enough chairs so that each child has a place to sit. Do not overcrowd your center. Too many children in the same area trying to work on the same project will only get in the way of each other as well as provide them an opportunity to waste time.

To solve this problem of overcrowding, it is suggested that the teacher enter into a contract with each student, with the student and teacher agreeing on just what should be done as well as when it should be done.

Types of Activities for Learning Centers



TIPS ON KID CONTRACTS

1. Each student should fully understand the terms of the contract.

2. Encourage the student to be realistic about his goals. He should be left with the idea that he alone should choose only what *he* really thinks he can achieve. Oftentimes children get caught up in arrangements which in reality they have little chance of completing. Their purpose in doing so is usually to gain the favor of the teacher.

3. The reward for completing the contract should come soon after the student has completed the terms of the agreement.

4. The philosophy behind contracting lies in encouraging greater responsibility on the part of the student. Offer as much help as needed when children are first learning this concept. Some children may not have been involved in this type of commitment before.

5. Rewards should only be given to those who actually live up to the terms of their contracts. To those who try very hard but do not quite get there, it's "better luck next time." You can offer them encouragement for the future, but they should not be rewarded as this places valid questioning in the minds of those students who actually complete their contracts.

6. Use language in contracts that can be clearly understood by students.

CONTRACT WITH A KID

Be it hereby established that _____
(name of student)
will successfully complete _____

_____
(specific tasks to be completed)

during the time period determined as _____

_____
(date when contract must be fulfilled)

Be it further stated that upon completion of the above conditions, the teacher _____

_____
(name of teacher)

will compensate said student with the following reward.

_____

_____

_____
(explanation of reward)

Date of Contract: _____

Signatures: _____
student

_____
teacher

STUDENT BEHAVIOR AGREEMENT

As a follow-up, the student's *very first step* toward this independence should be a commitment similar to the one below in which the student actually promises to conform to an acceptable school behavior. The written commitment seems to be much more effective behavior.

On this day I, _____,
agree to the following conditions each time I enter the learning center:

To enter the center quietly

To go directly to work on an activity that is appropriate for me and has been approved ahead of time

To work quietly without bothering others

To return everything I use to its proper place before I leave the center

To properly record an accounting of my work and to place that finished work where it belongs

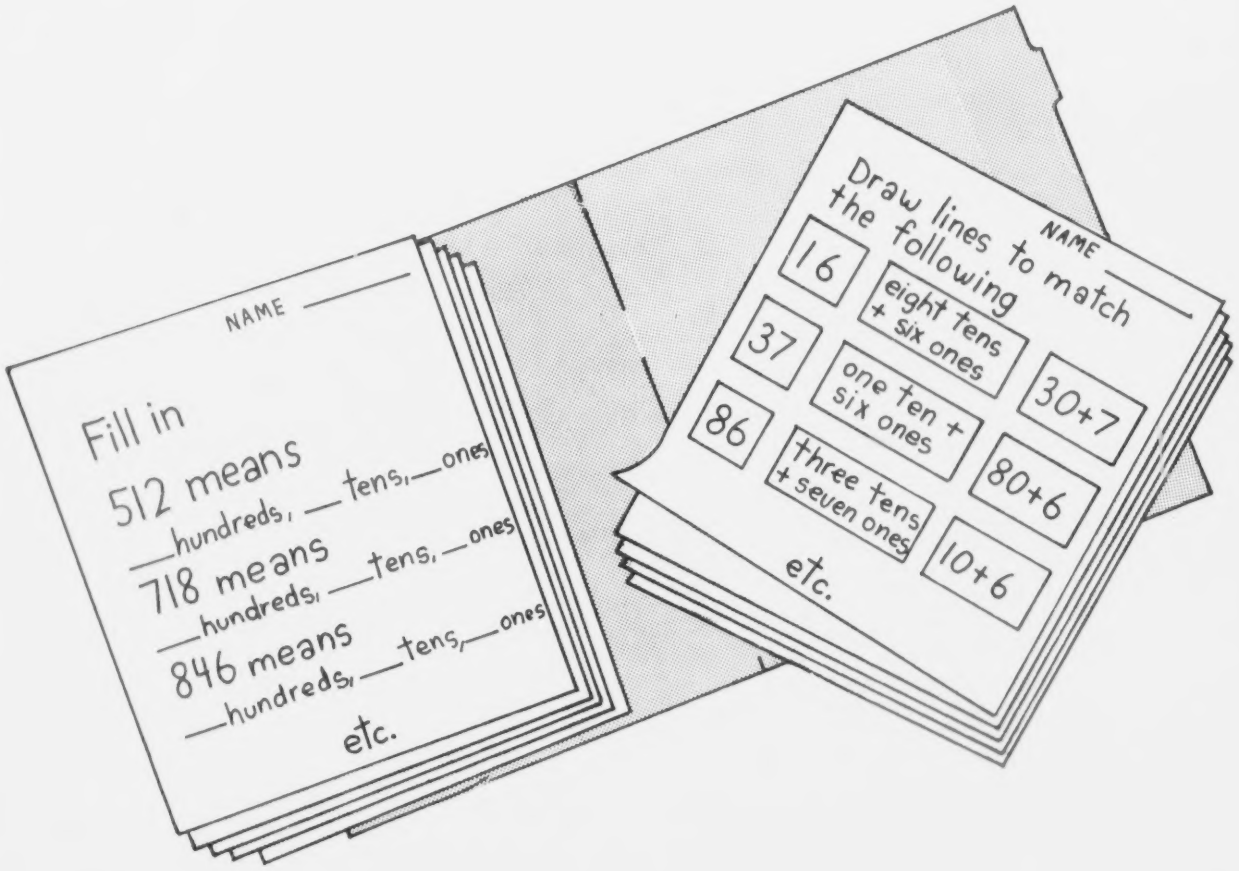
_____
Student

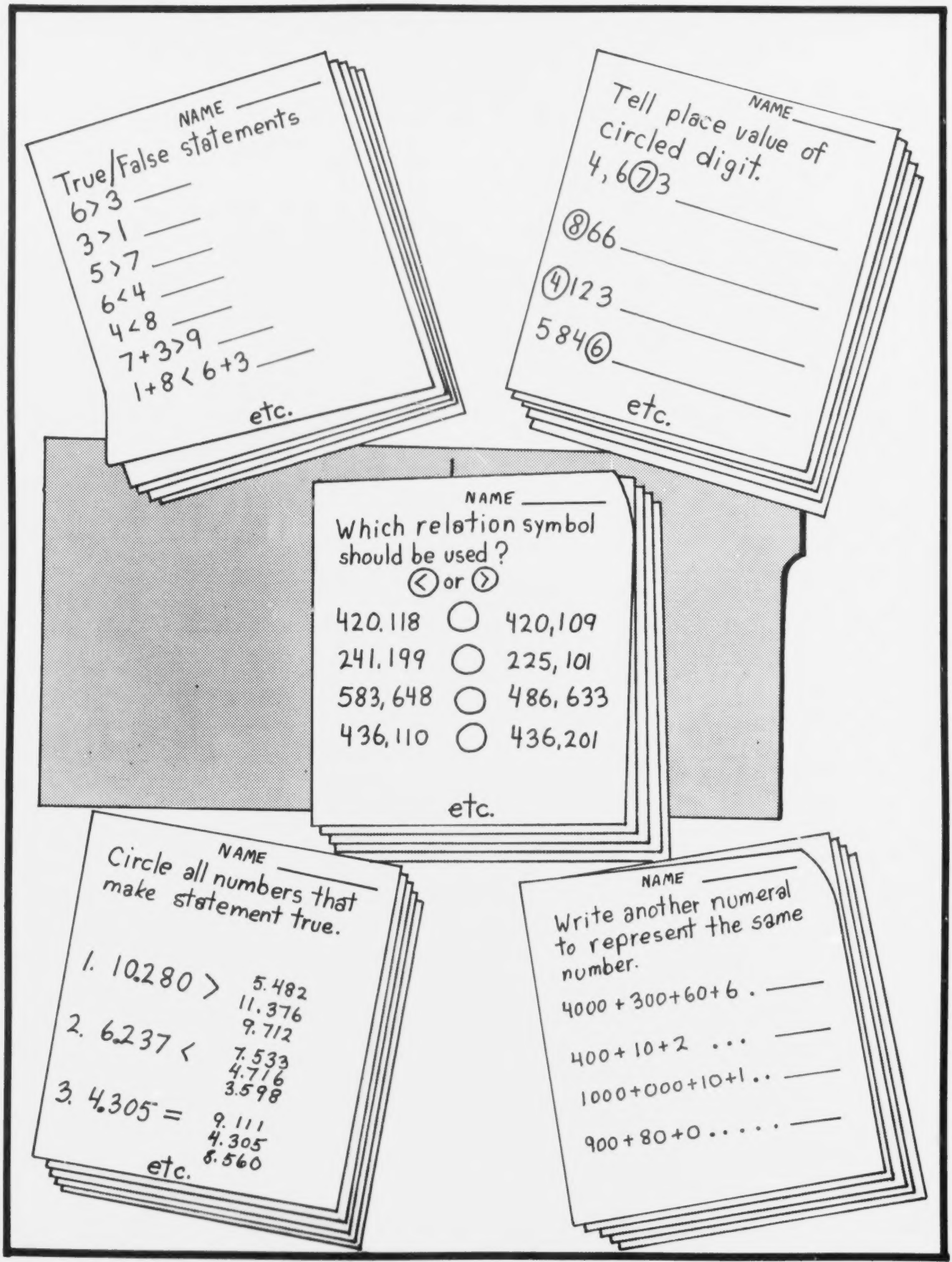
_____
Teacher

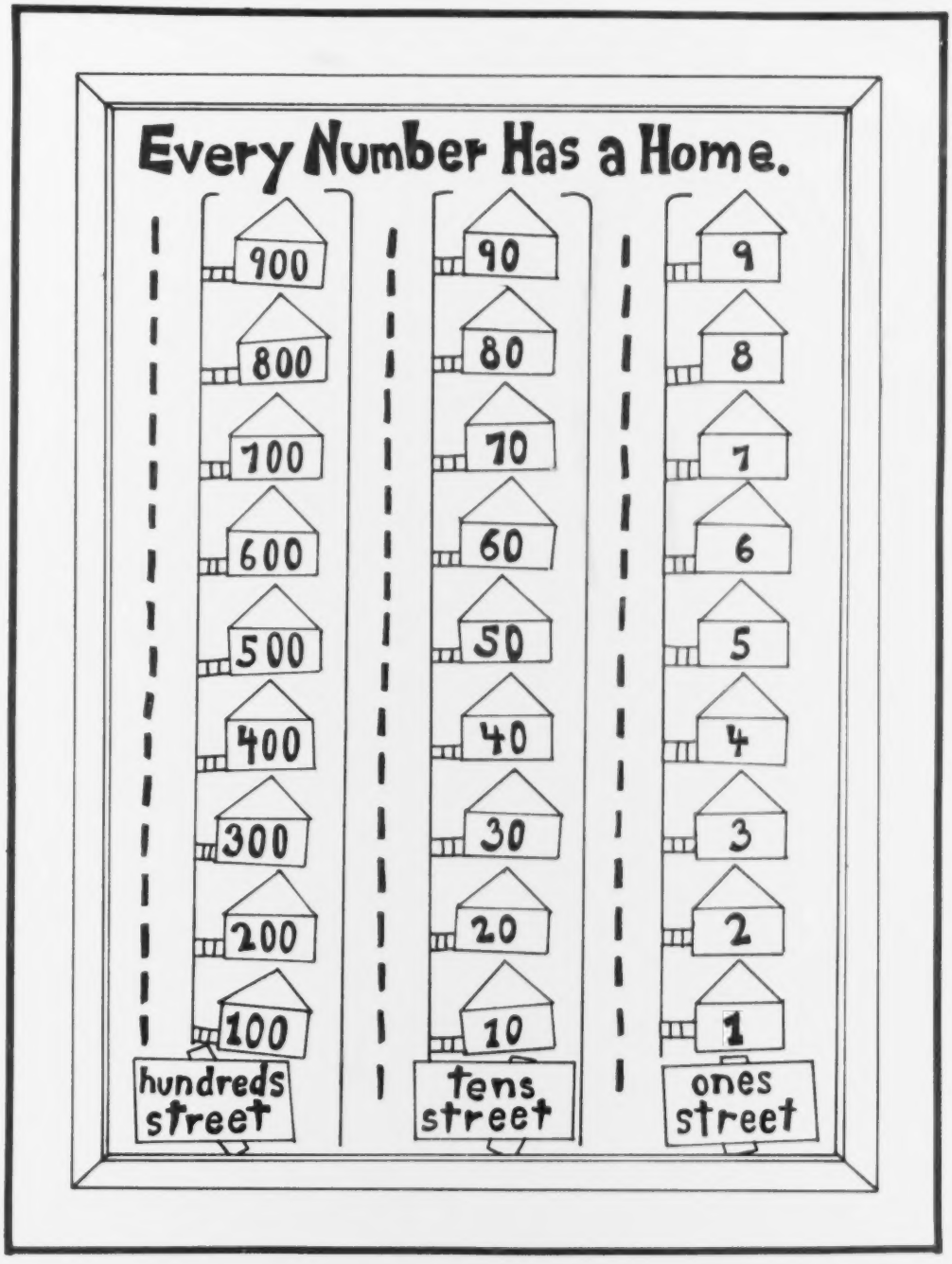
PLACE VALUE CENTER...

Prepare seven different worksheets using examples that are similar to those found on these two pages. In addition you should place enough problems similar to those below and on the next page to fill up an entire activity sheet. Then you can reproduce them onto ditto masters and place several copies of each in separate folders. Clip an answer sheet to the back of each folder to allow student self checking. Place the manila folders either inside a larger box or tack the folders to a bulletin board within the center.

Try to place the center near a bulletin board area where you can create a display that will motivate and encourage your students to participate in a center's activities.




NAME
True/False statements
6>3
3>1
5>7
6<4
4<8
7+3>9
1+8<6+3
etc.
NAME
Tell place value of circled digit.
4,6(7)3
(8)66
(4)123
584(6)
etc.
NAME
Which relation symbol should be used?
(<) or (>)
420.118 ○ 420,109
241.199 ○ 225,101
583,648 ○ 486,633
436,110 ○ 436,201
etc.
NAME
Circle all numbers that make statement true.
1. 10.280 > 5.482 11.376 9.712
2. 6.237 < 7.533 4.716 3.598
3. 4.305 = 9.111 4.305 8.560
etc.
NAME
Write another numeral to represent the same number.
4000+300+60+6 .
400+10+2 ...
1000+000+10+1 ..
900+80+0 .....



Use poster board for background and cut houses out of various colors of construction paper. Use black felt tipped marker for numbers and street signs. Place bulletin board in Place Value Learning Center to capture student attention.

On the first day the board is placed in the learning center, ask students if they understand the concept behind the idea. If they do not, explain to them thoroughly.

A-MAZIN'

Find your way through this maze of odd numbers by tracing the route taken by the "evens" from the start to the finish.

START 2	4	17	39	49
59	33	12	89	1
91	18	73	57	9
36	42	50	31	13
51	37	82	23	29
7	19	40	92	14
37	43	87	56	98
25	3	67	47	68 FINISH

...AND WHEN IN ROME...

You may think you will never have any use for Roman numerals. Just wait! Look at the lower right hand corner of any old building. Do you see some Roman numerals? If not, you may have to walk all the way around the building, but they should be there someplace. Those numbers represent the year in which the building was built; and unless you know about Roman numerals, you'll just never really know that important fact, will you?

Here are some of the numerals used by the ancient Romans:

I	=	1
V	=	5
X	=	10
L	=	50
C	=	100
D	=	500
M	=	1000

Write the Hindu-Arabic numerals for each of the following.

LXXXVIII _____
CMXC _____
MCMXVI _____
XLVII _____
CMXLI _____
DCCXLVII _____
MCMLXIV _____

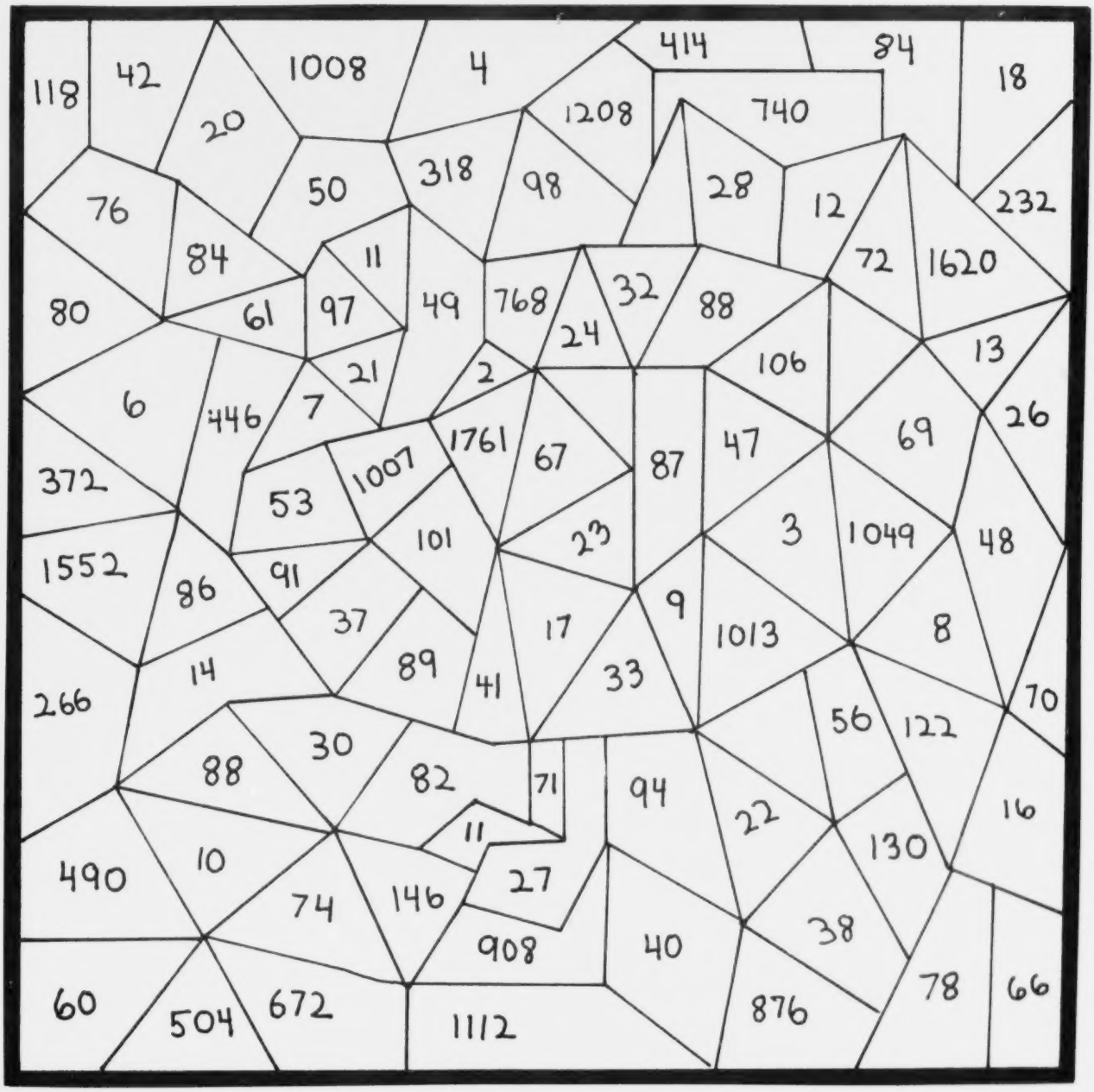
Write the Roman numerals for these numbers.

386 _____
999 _____
62 _____
18 _____
436 _____
706 _____
1012 _____
1981 _____
2482 _____

See! There's one reason already for knowing how to read Roman numerals. Another reason is to try to dazzle your math teacher with your brilliance. She may not know how really smart you are!

THE HIDDEN ANIMAL...

Find the hidden animal in the puzzle below by shading in all even-numbered areas. Leave the odd-numbered areas alone.



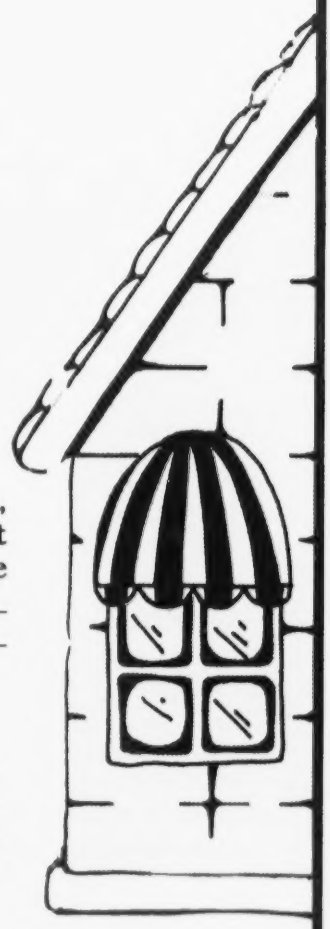
THE BROWN HOUSE CAFETERIA

Mrs. Jackson keeps records for the Brown House Cafeteria. A part of her job involves recording the number of lunches that are served annually in the cafeteria. Last year she reported that forty-one thousand, eight hundred seventy-six lunches were served. Write this number.

_____

Two years ago the same cafeteria served forty-two thousand, two hundred three lunches. Write down the number that represents this many lunches. Then compare the number of lunches served two years ago with the number served last year. Was the number greater than (►) or less than (◄)?

_____



Other figures which she recorded of importance:
Last year the Brown House served thirty-two thousand, seven hundred eighteen cups of coffee. Two years ago it served thirty-thousand, nine hundred sixty-nine. Write both of these numbers. _____

_____

Two years ago the cafeteria sold five thousand, two hundred thirty-two cartons of milk. Last year only four thousand, eight hundred forty-eight were sold. Compare these two numbers by writing both, then telling in which year more cartons of milk were sold.

_____

_____

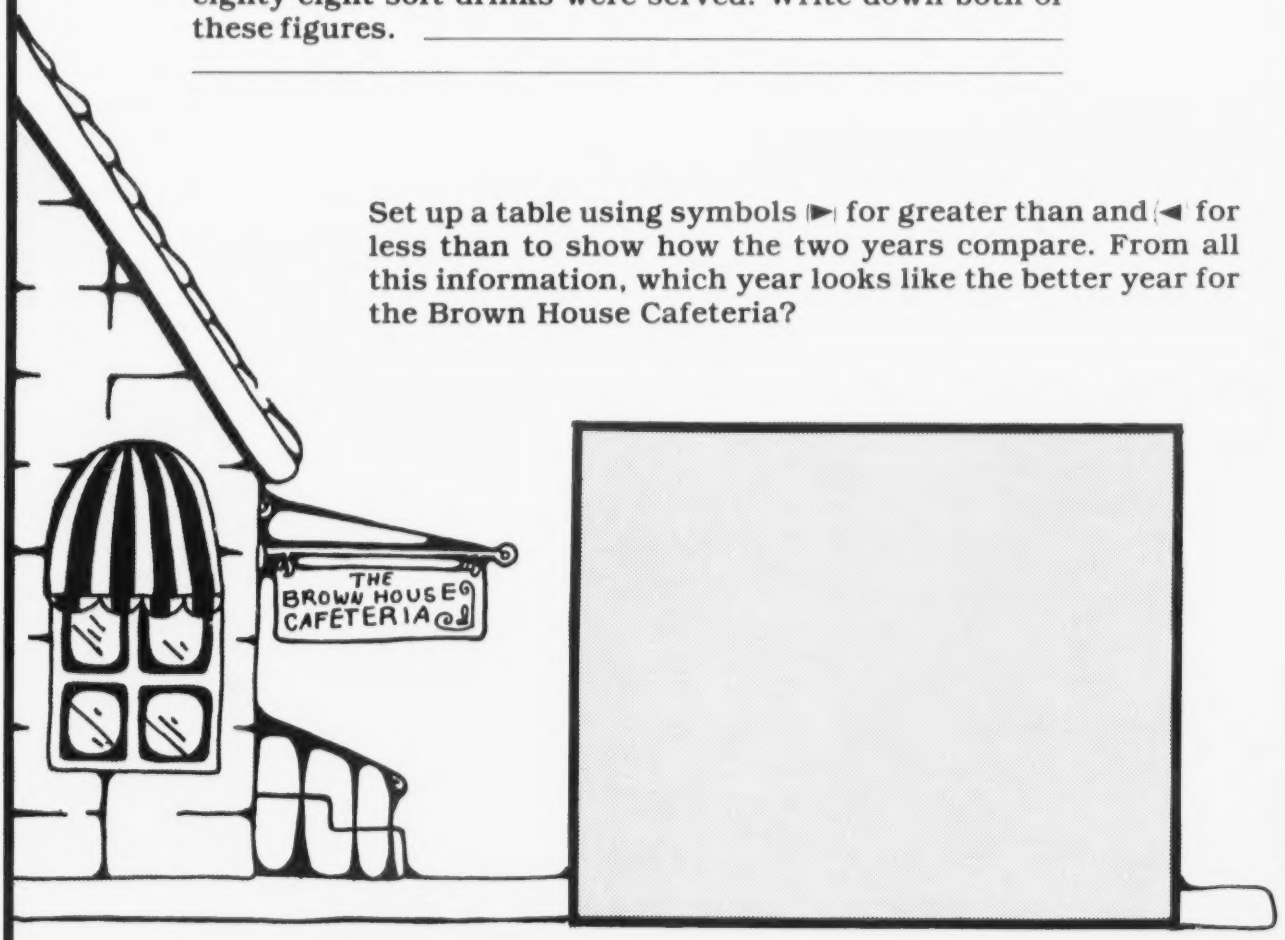
THE BROWN HOUSE CAFETERIA (continued)

Last year Brown House recorded sales of four thousand, six hundred fifteen glasses of iced tea, while sales of two years ago amounted to four thousand, eight hundred sixteen. Write down both of these figures. In which year were people thirstier for iced tea? _____
Write both of the figures using numerals. _____

_____

Mrs. Jackson also found that two years ago three thousand, eight-hundred twenty-six soft drinks were served during lunch, whereas last year there were four-thousand, eighty-eight soft drinks were served. Write down both of these figures. _____

_____



Set up a table using symbols ► for greater than and ◄ for less than to show how the two years compare. From all this information, which year looks like the better year for the Brown House Cafeteria?

Why do you suppose anyone would want any of the information like that which Mrs. Jackson has recorded? Of what use is it? Who would really want to know? Why should anyone care?

IN PROPER SEQUENCE

See if you can read the thoughts on Becky's mind in the game below...

When Tom says:

3
9
18
36

Becky says:

6
12
21
39

It shouldn't take you long to figure out that Becky is adding 3 every time Tom says a number...right???

Place yourself now in Becky's shoes and fill in the missing numbers below:

6	8	____	12	____	16	____	____
1	6	11	____	21	____	____	36
16	14	15	____	14	12	____	____
36	32	____	24	____	16	____	8
0	1	3	6	____	____	____	____
____	____	36	____	____	____	____	86
1	1	2	6	____	____	____	____
0	6	8	4	____	____	8	____

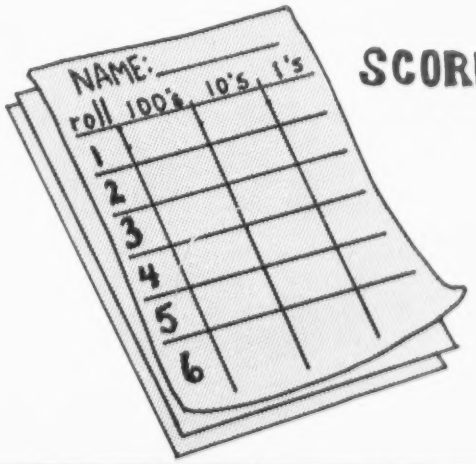
IN PROPER SEQUENCE (continued)

Design a puzzle of your own and try to stump your classmates.

Game board is constructed on 14" by 14" tag board. Cover with Con-Tact paper.

Either two or three players can play this game. Each player has a token and a scorecard similar to the one on this page.

The first player rolls the die and advances his token the number of spaces indicated on the die. He then records on his score sheet the place value of the number where his token landed. The second player then rolls the die and advances accordingly. Each player rolls the die six times. At the end of six rounds players then total up the number of ones, tens and hundreds each has. That total is then written as a whole number and the player with the largest number wins.



SCORECARD

TOTALS:

Number _____

(student)

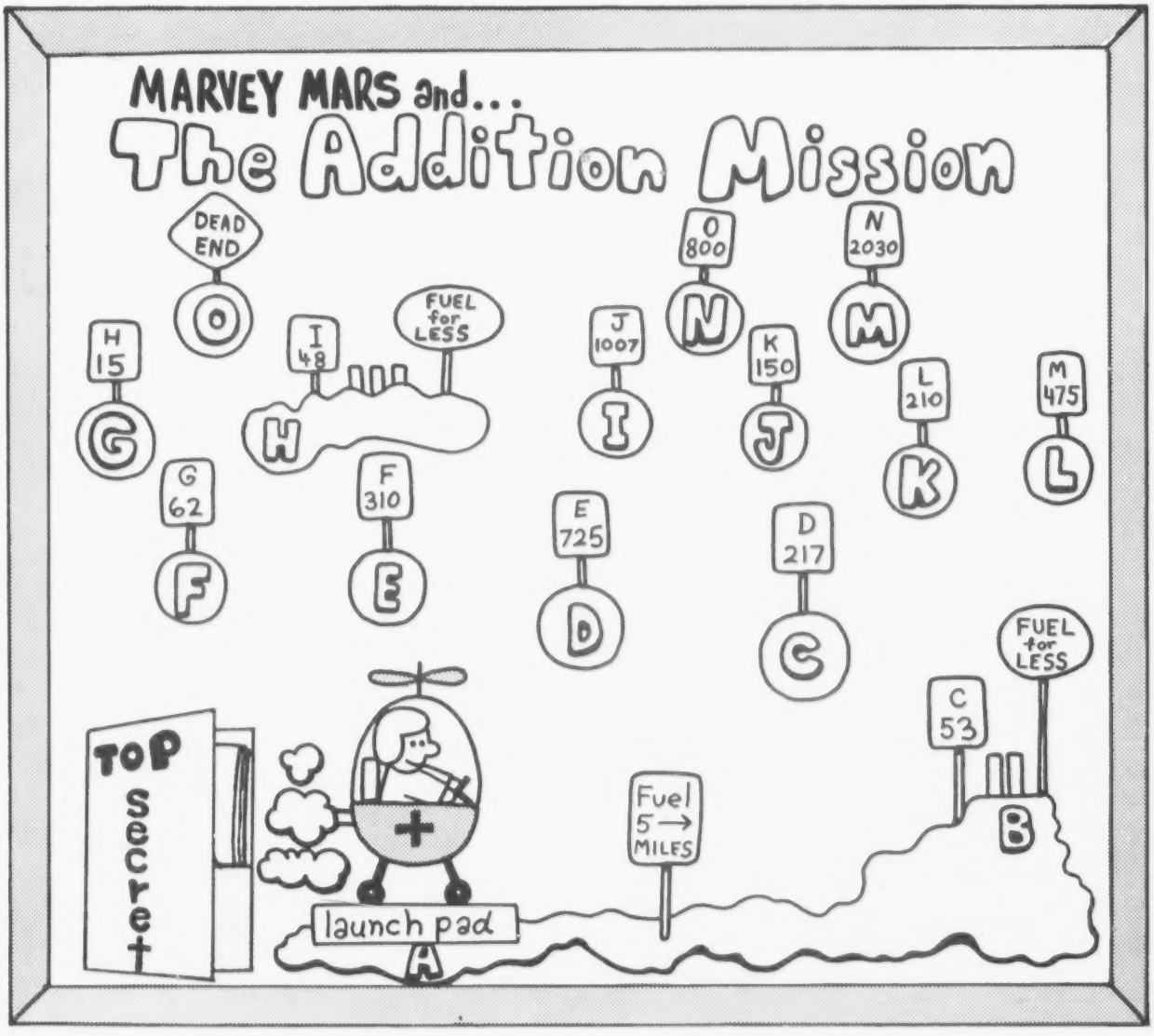
Has Earned a Place at the Head of the Class for Work in Place Value

(teacher)

(student)

HAS SCORED A HIT IN MATH

(teacher)



The number of miles can be changed to suit the particular level of student you are dealing with.

SAMPLE PROBLEM

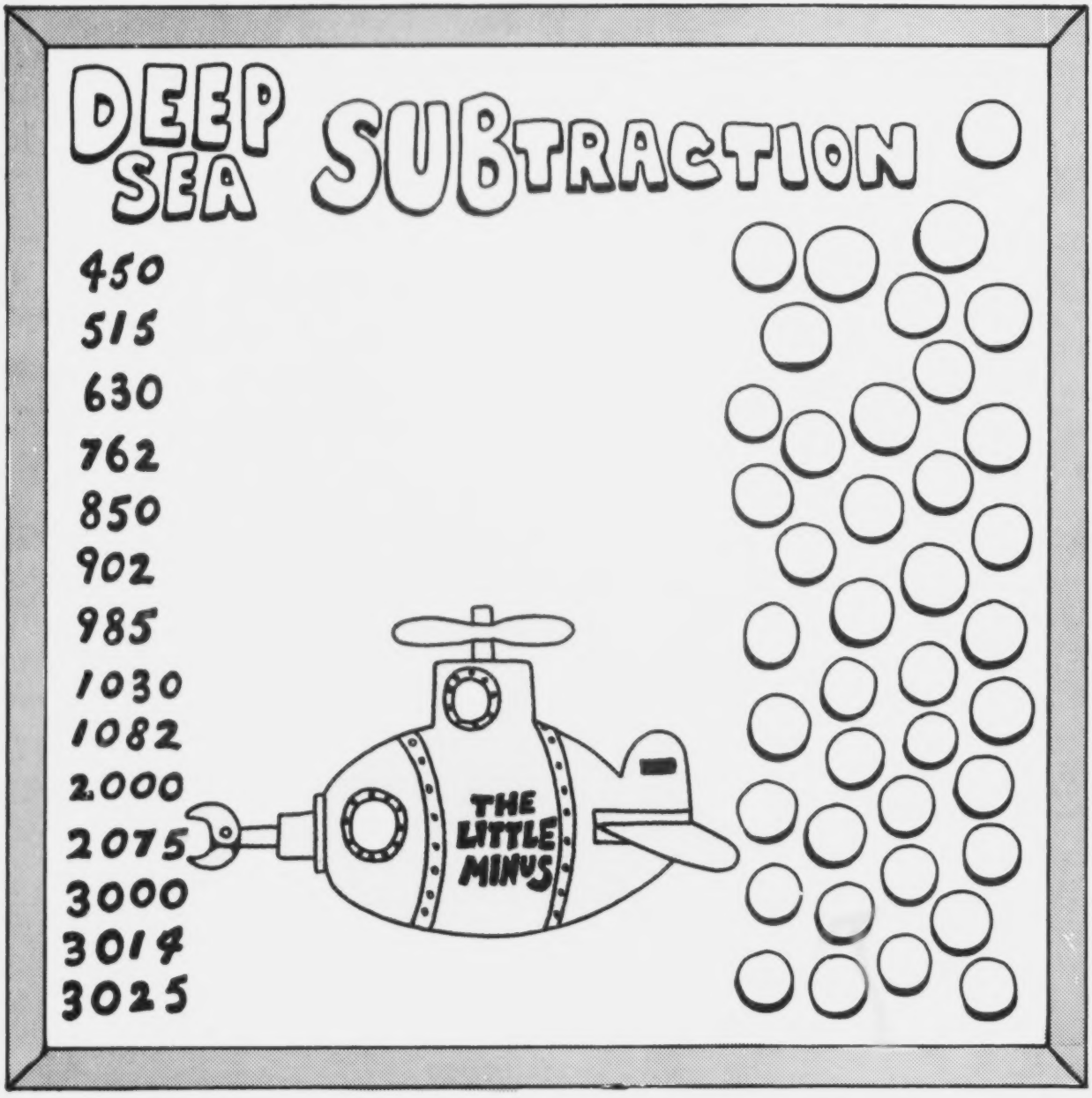
What is the distance from A to D? To get the correct answer, student would have to add the following:

5...the distance of A to B
53...the distance of B to C
217...the distance of C to D

SAMPLE PROBLEM

What is the distance from E to H? To get the correct answer, student would have to add the following:

310...the distance of E to F
62...the distance of F to G
15...the distance of G to H

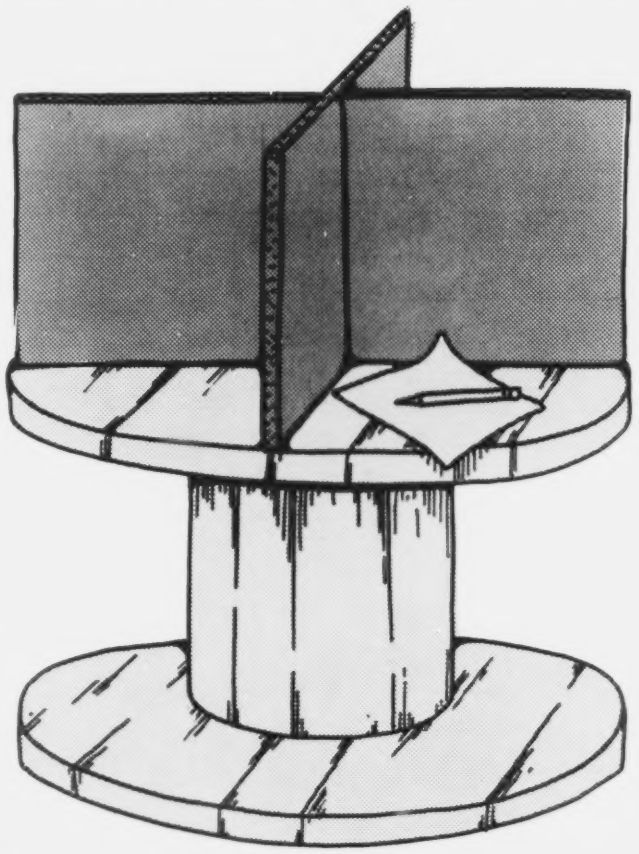


Here is a bulletin board idea for the whole class. Use light blue construction paper, posterboard or cloth for the background in this deep sea delight. Make the LITTLE MINUS out of a contrasting color of posterboard and cover with Con-Tact paper to ensure durability. The numbers on the depth chart, the letters and the forty bubbles are similarly made using a contrasting color that can easily be seen.

The reverse side of each bubble has a number on it that is smaller than any of the numbers on the depth chart. Have one of your students move the LITTLE MINUS to any depth he desires. He then chooses one of the bubbles to serve as the subtrahend. The student then subtracts the number on the bubble from the depth of the LITTLE MINUS with the rest of the class checking for accuracy. Then it's someone else's turn.

SPOOL CENTER

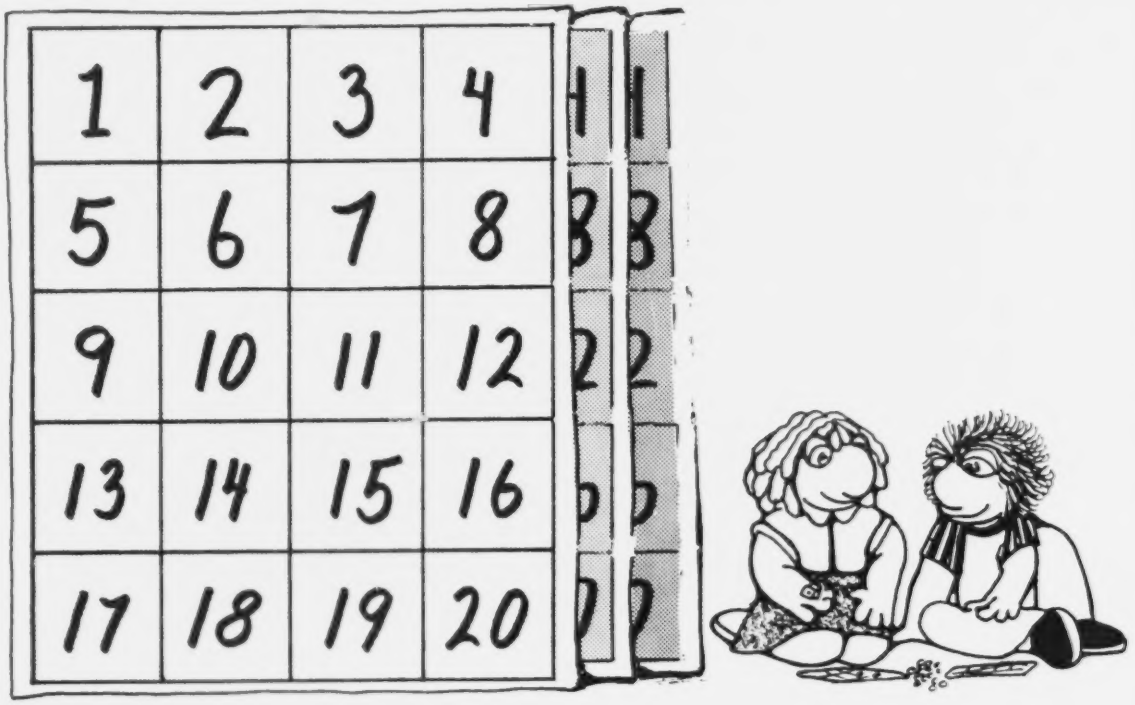
Old wooden spools that once held utility company cable make excellent learning stations. They can be painted bright colors to liven up your learning center even more. Use dividers in the center to provide for individual learning stations. The best thing about this type of center is that it doesn't cost anything. Local utility companies are usually more than happy to donate them to the schools.



There are several different types of learning centers that can be used with a subject like mathematics. Scattered throughout this book are several suggestions for the construction and design of learning centers. It is the hope that the reader will be able to adapt each to specific content areas that are most important to her. Not to be forgotten are the all-important factors of space limitations and the availability of materials. Design and arrangement should not be limited to any one specific type of classroom. Learning centers are effective educational tools in both traditional and open space classrooms. It usually comes down to a case of teacher ingenuity in determining the best possible use of the available space and resources.

COVER 20

Construct the boards for this game out of tagboard similar to the one shown below. To preserve the life of the game boards, cover them with Con-Tact paper. You will also need to make several boards as each player needs a board.

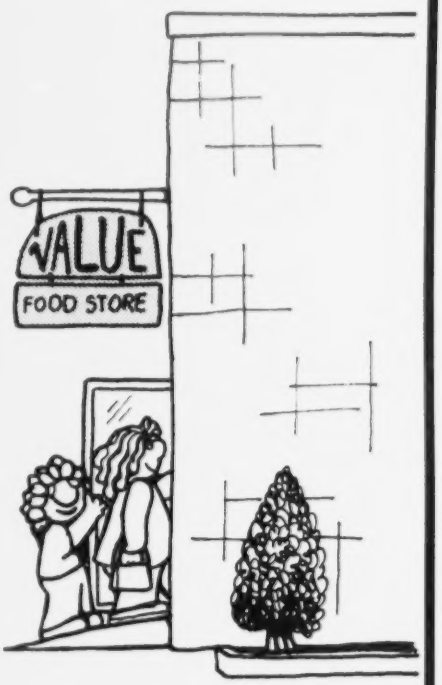


Students will need four dice to play this game plus at least twenty tokens per player. The object of the game is to cover all twenty numbers with tokens.

Players roll a single die to determine order of play. The highest roll goes first. The first player rolls the dice, then adds the spots on his dice. Once he has that sum, he covers the same number on his game board with a token and passes the dice on to the next player. Should a roll produce a combination that is already covered, play merely moves on to the next player.

Players *always* have the option of deciding *how many* dice to use prior to each roll. A player can choose to roll a single die, a combination of two dice, a combination of three dice, or a combined total of all four dice. The numbers covered on his board will more than likely determine the number of dice he uses. The first player to cover all twenty of the numbers on his board is the winner of the game.

GOOD....BETTER....BEST...



Which of the following is a *good* buy?

Last week lettuce sold for $ .68/head. This week lettuce is on sale for $ .49/head. Is lettuce a good buy this week?

Last week peanut butter (a top brand name) sold for $1.85 for a 64-oz. jar. This week that same jar of peanut butter costs $2.15. Is peanut butter a good buy this week? What could possibly cause the price to rise so sharply in just seven days?

What considerations must be given to whether or not to buy the peanut butter at this high price?

Should the wise shopper stock up on lettuce when the price is low? Is it wise to buy three heads of lettuce? How about five heads? Ten heads? What is wrong with this type of thinking?

Is it better to buy.....

...a 32-oz. bottle of fabric softener for $1.39?

...a 64-oz. bottle of fabric softener for $3.27?

...or a 96-oz. bottle of fabric softener for $4.75?

GOOD....BETTER....BEST(continued)

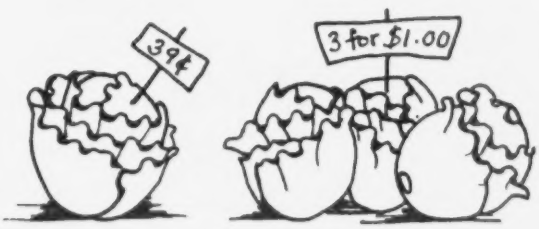
Which is the *best* buy?

A small 12-inch pizza for $4.95?

A medium sized 14-inch pizza for $5.95?

A large sized pizza with a diameter of 16 inches for $7.95?

How are you going to possibly calculate which of the above is the best buy?



Which is the *best* buy?

...an 11-oz. box of breakfast food for $ .99?

...a 13-oz. box of the same breakfast food for $1.15?

...or a one-pound box (16 oz.) of breakfast food for $1.44?

Which is the *better* buy?

one cassette for $6.95 or
two cassettes for $12.50?

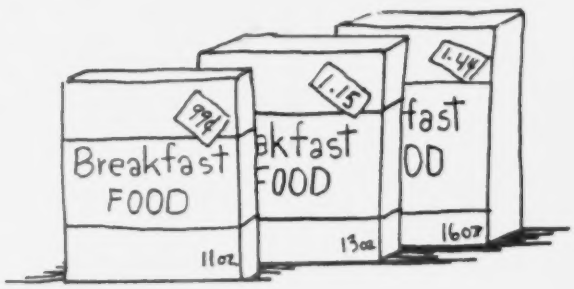
six breakfast rolls for $.79 or
a dozen for $1.80?

two ties for $9.00 or
three ties for $13.00?

three golf balls for $4.00 or
one dozen of the same balls for
$15.00?

one head of lettuce for $.39 or
three heads for $1.00?

four colored pens for $.79 or
a package of six pens for $1.50?



What considerations other than just price should be made when buying any of the above?

MAKING CHANGE

If you were a clerk in a department store and the following purchases were made by people who passed through "your register," how much change would you give to each of them?

After you've calculated the amount of change the customer has coming, draw in the denominations you would give to them and make the drawings in the order in which you would hand the change to the customer.

For example, a purchase that costs $ .79 has $ .04 tax added on or a total of $ .83. If the buyer gives you a dollar bill, you owe the customer $ .17. To make change properly, you should give the customer two pennies, one nickel and one dime as shown.

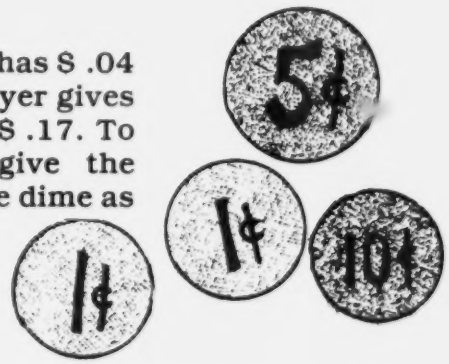


Figure the change on these purchases and draw pictures of the money that should be given back.

A lady's bill comes to $5.95 plus she owes $.30 tax. She gives you two five-dollar bills.

The bill for a tennis racket comes to $23.00. There is also $1.15 owed in tax. The buyer gives you a twenty-dollar bill and a ten-dollar bill.

The next customer through your aisle has purchases totaling $37.87 (including tax). You are given a fifty-dollar bill.

A person buys a vaporizer for $14.00. Tax comes to $.70 and the buyer gives you a twenty-dollar bill.

The bill on a number of small items totals $16.20. If sales tax amounts to $.81 and the buyer gives you a twenty-dollar bill, figure the change she has coming back.

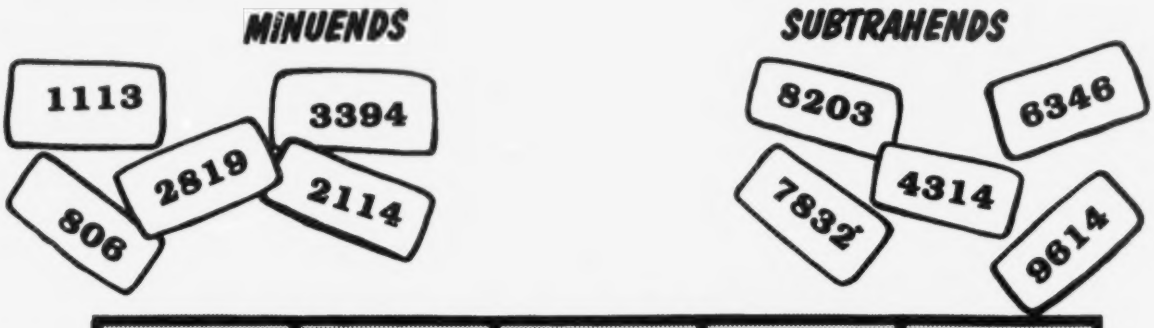
Your final customer is the "big spender" of the day and has purchases that total $86.79. She gives you a one hundred-dollar bill. Calculate the change you should return to this customer.

NUMBER WORMS

FILL IN MISSING SYMBOLS BELOW

SUBTRACTO

Construct game cards similar to the card shown below. Make several cards, all containing the same numbers; however, numbers should be placed in different places on each card. You can also make many other combinations by changing *minuends* and *subtrahends*. Laminate or cover each with Con-Tact paper to ensure durability. Players will also need several tokens.



2200	7026	3201	7090	6719
7397	5384	920	5718	8808
1495	4809	6795	3508	5233
5013	4232	3527	4438	7500
8501	2952	6089	5540	6220

This game is played by two players. Each player selects a game card. The first player selects a number from the pool of *minuends* and a number from the pool of *subtrahends*. He then subtracts and places a token on the difference.

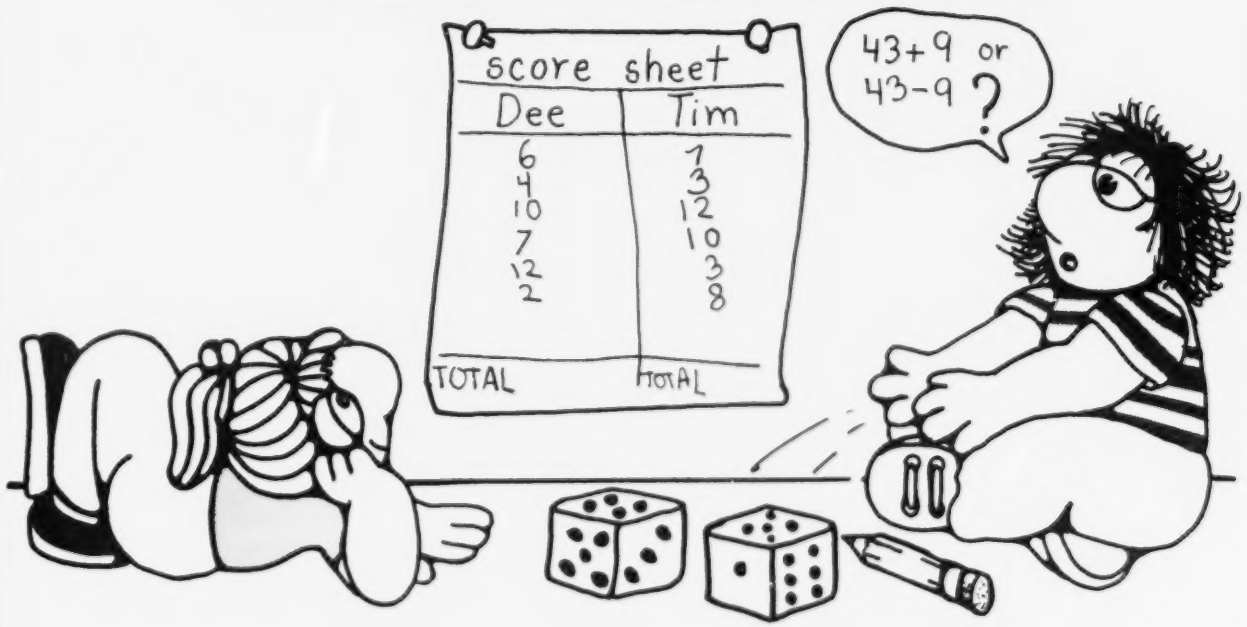
The second player also places a token that covers the number wherever it may appear on her game card. The first player to complete a row vertically, horizontally or diagonally wins.

HIGH ROLLER

Two rollers can play this game. Both players roll the dice to see who goes first. Both players roll both dice and then add the two together to get the total.

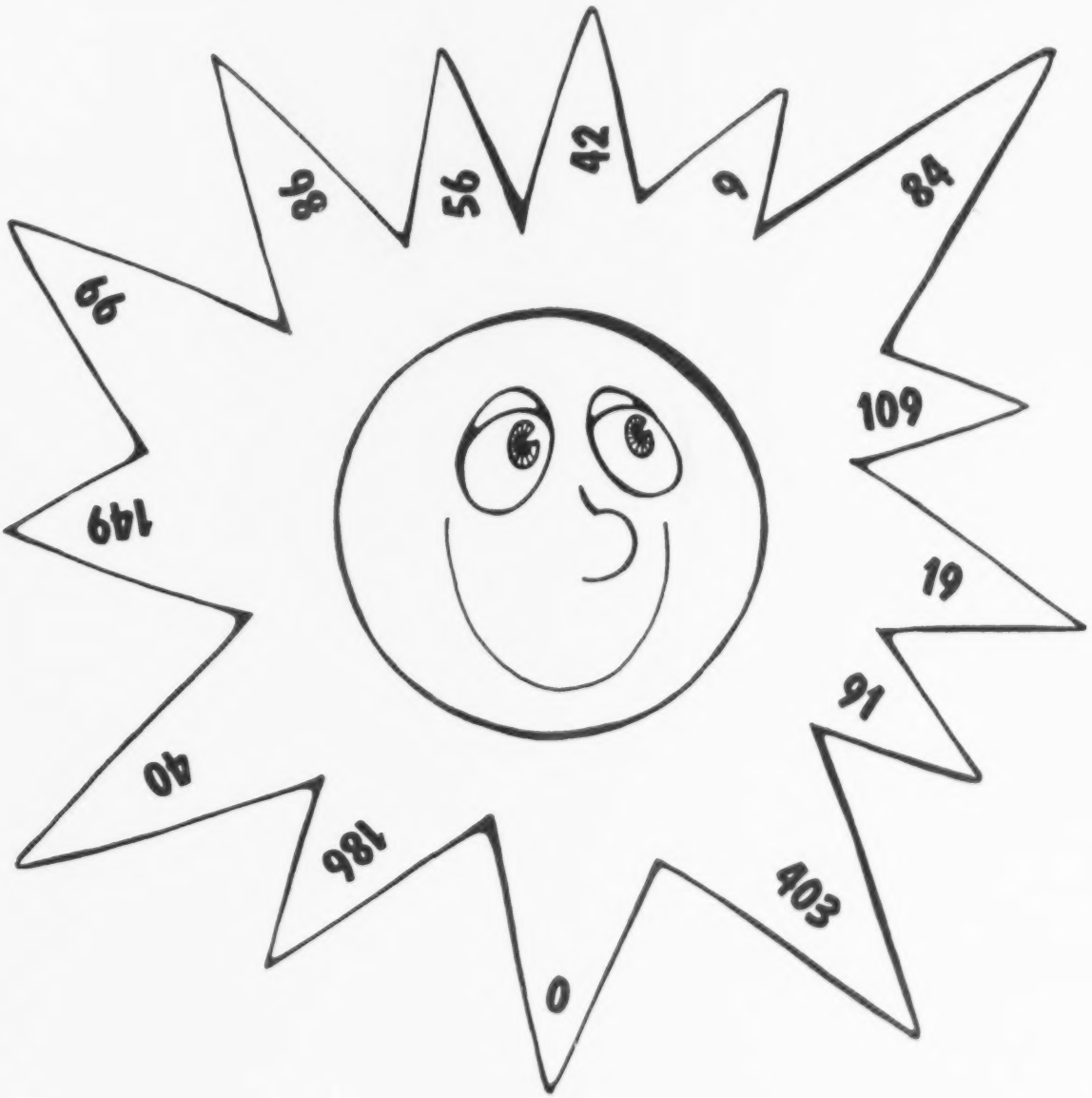
Both players start at zero. The idea of the game is to score *exactly* 50 points. Each player has the choice of either adding his roll or subtracting it from his score. If a player's total at any given moment will exceed 50, then he has no choice....he must subtract the roll from his total.

For example, Player A has accumulated a total of 43 points from previous rolls. He then rolls a 5 and a 4 on his next roll. Adding the two together would give him 9 plus his original 43 or a total of 52 points (which is beyond 50). Thus he would have no choice but to subtract the roll (9) from his score which would leave him with a net score of 34. He must try again when it is his turn. To win the game, a player must land exactly on the accumulated total of 50. Keep all rolls and totals on a score sheet to check final outcome.



LET THE SUM SHINE IN

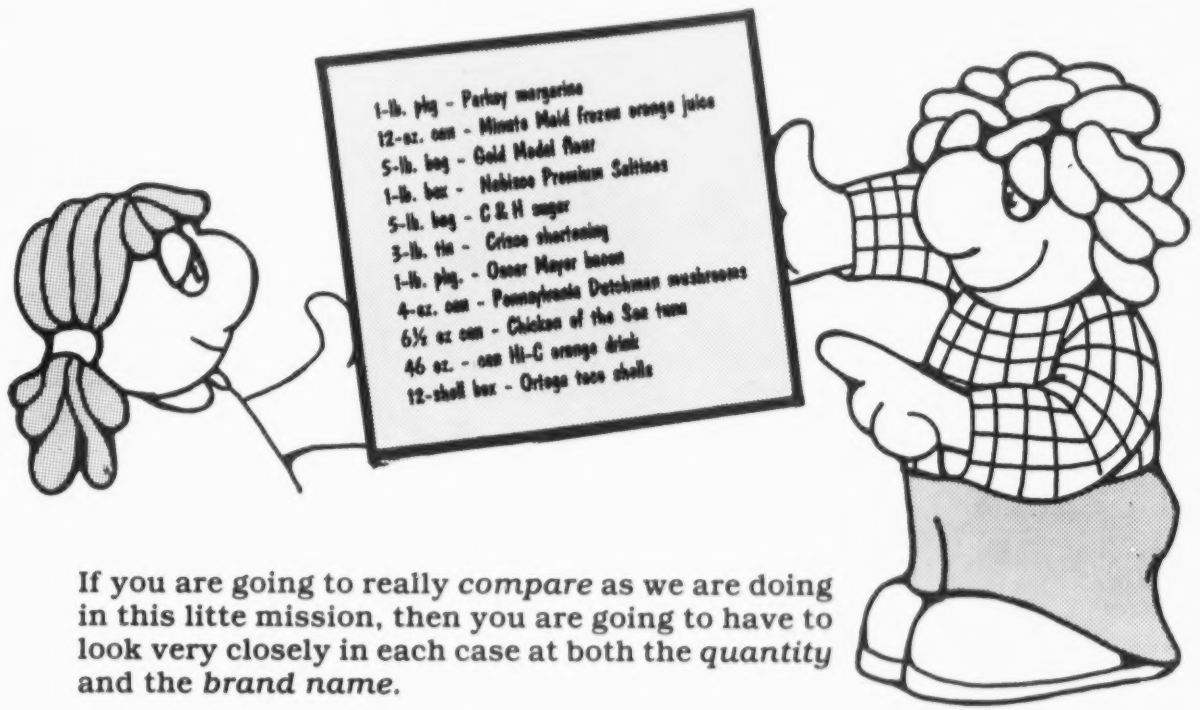
Add all the numbers on the rays together to get a really brightly shining sum.



SUPERSHOPPING FOR GROCERIES

You'll need to team up with a friend for this one. You and your friend are going to actually go to some grocery stores and see what certain food items costs these days. It's really pretty wise shopping to compare prices at different stores every once in awhile. After all, these days you want to stretch those dollars just as far as they will go. Parents do this all the time. Let's have you give them some help.

First, look closely at the list below:


1-lb. pkg - Parkay margarine
12-oz. can - Minute Maid frozen orange juice
5-lb. bag - Gold Medal flour
1-lb. box - Nabisco Premium Saltines
5-lb. bag - C & H sugar
3-lb. tin - Crisco shortening
1-lb. pkg. - Oscar Mayer bacon
4-oz. can - Pennsylvania Dutchman mushrooms
6½ oz can - Chicken of the Sea tuna
46 oz. - can Hi-C orange drink
12-shell box - Ortega taco shells

If you are going to really *compare* as we are doing in this litte mission, then you are going to have to look very closely in each case at both the *quantity* and the *brand name.*

Armed with the list and a sheet of scratch paper, you and your pal should go to at least two *different* stores. Find every item on the list in each store and record its *exact* cost. You might even take along a parent or older brother/sister to help. Once you've completed all the "leg work," sit down with your friend and figure out which store has the "best buys" according to the items you have on your list.

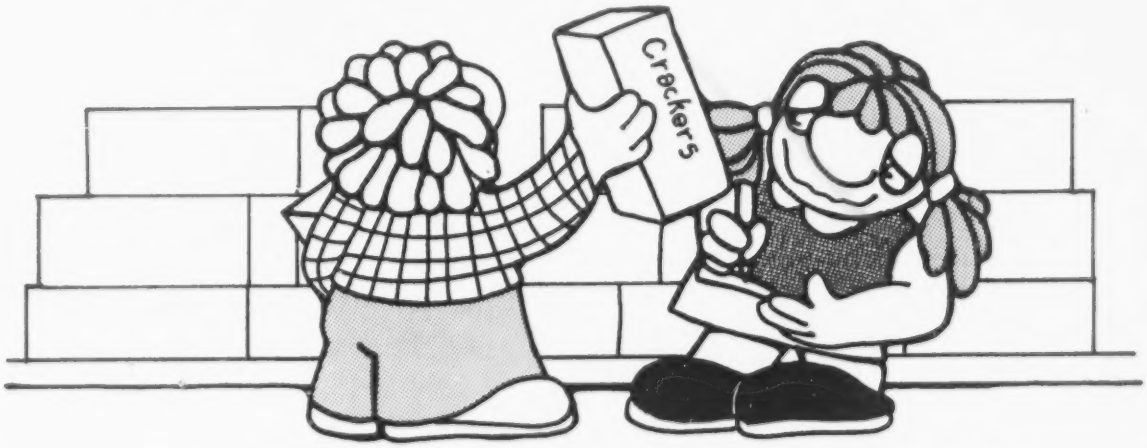
Does this mean that this is the "best store"?
What other factors do people consider when deciding where they buy their groceries?

SUPERSHOPPING FOR GROCERIES (continued)

How do things like convenience, location, service and cleanliness enter into a mom's or dad's decision to buy the family groceries at a certain place?

Perhaps you've heard someone say, "You're just paying for the name when you buy....." Sometimes brand name isn't really very important to people when they buy their groceries. There are even groceries today that are packaged in containers without any brand name on them at all. They're called *generic* foods and they really do save you SSSSS.

The quality of *generic* foods may be just as high as some of the brand names or it may not. It's just a matter of personal taste. One thing for certain though is that no money is spent on advertising (which adds to the cost of the groceries we buy).



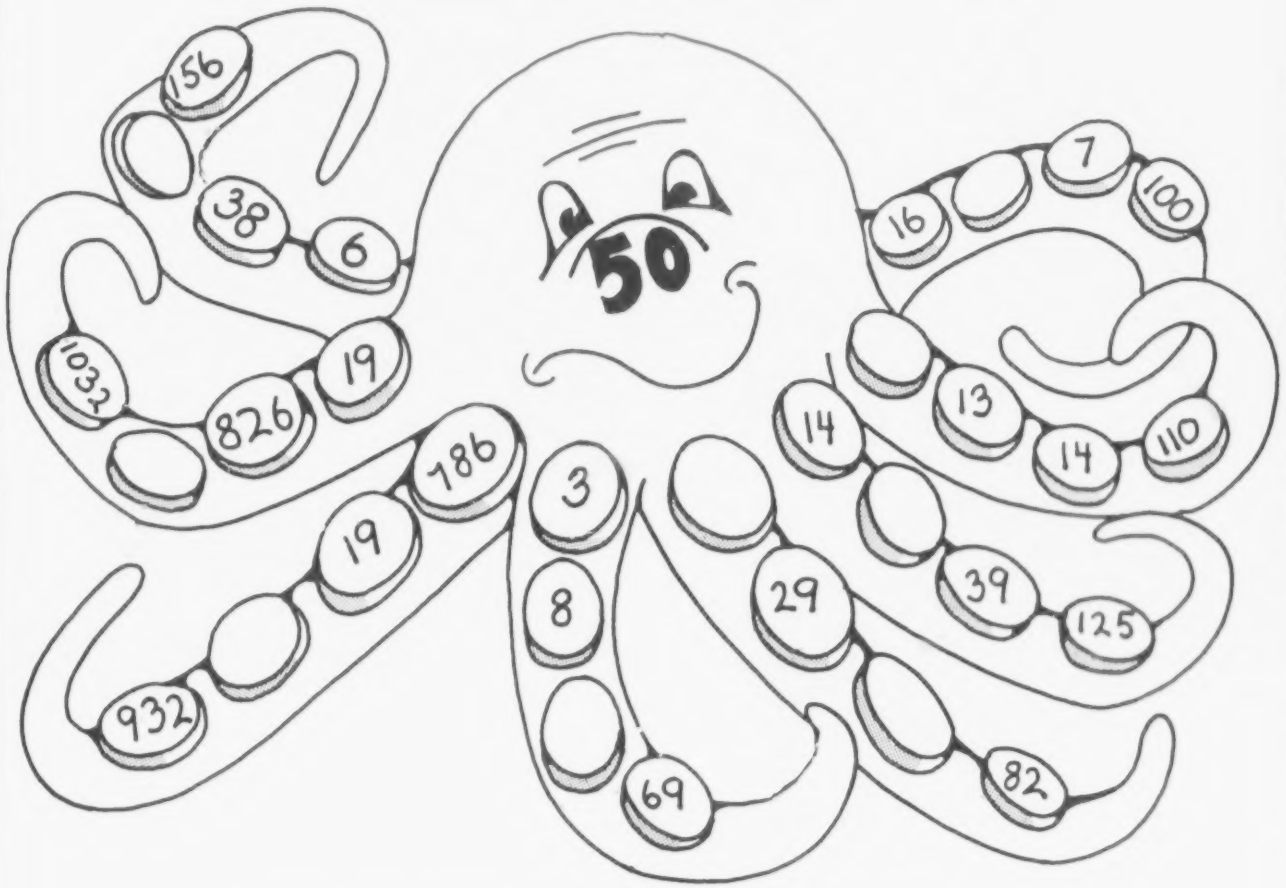
With your friend, go back to those same two stores (or choose two others if you like) and this time find the *least expensive* package or container that holds the same quantity as the package on your list.

Now which store offers the *best* buys? Compare the lists item for item. Then total them all up. When you get home, ask one of your parents whether *brand name* or *price* is most important at your house.

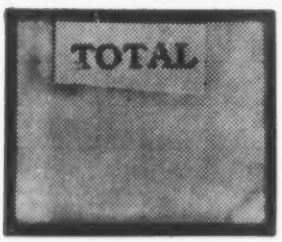
There's a neat word for all this "research" you've been doing. It's called *consumerism*.

OSCAR N. OCTOPUS

Fill in the missing numbers on Oscar's tentacles. The number on the end of each tentacle is the sum of the addends on that tentacle including the number in the center.

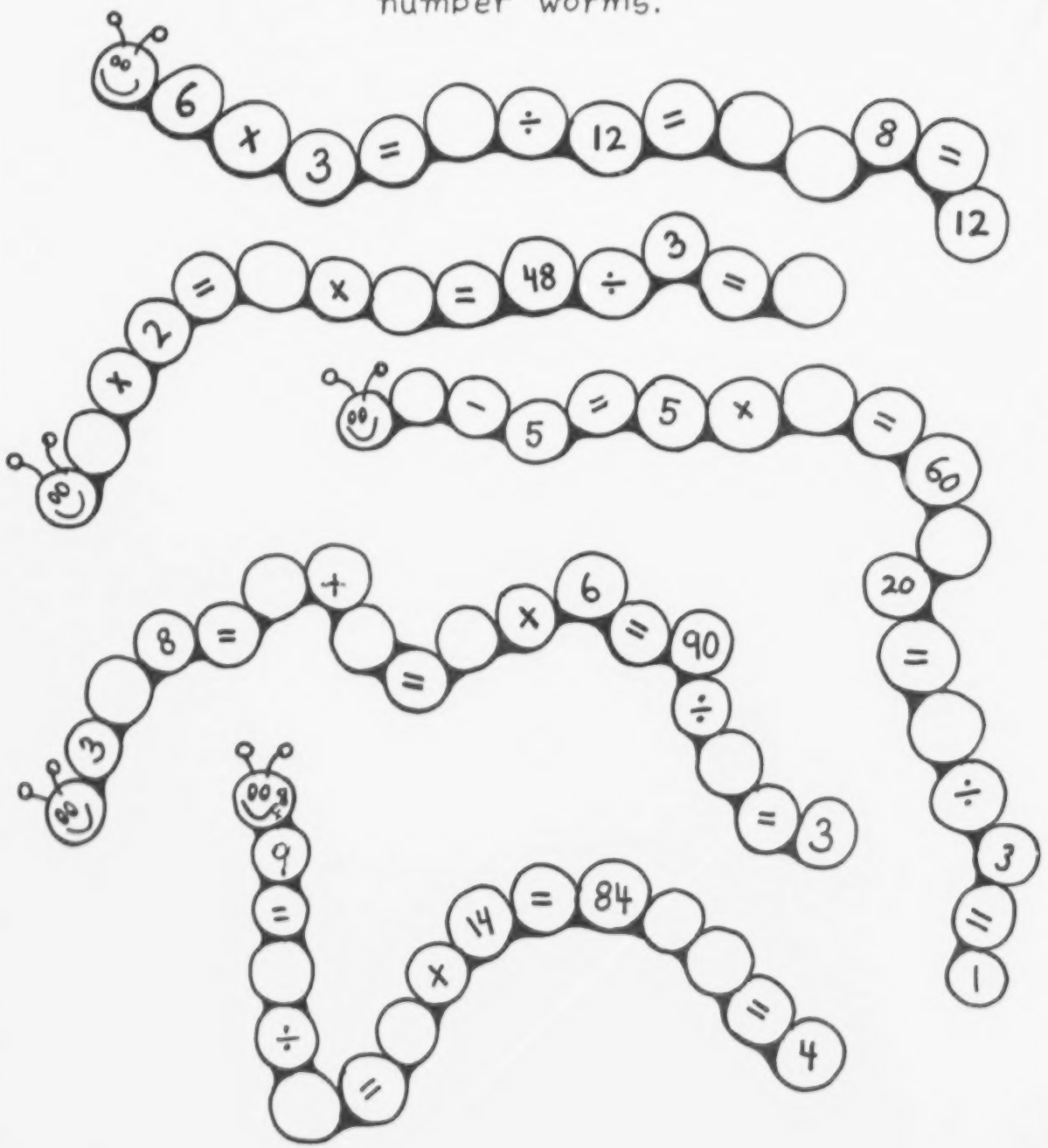


What is the total sum of all the missing numbers?



MORE NUMBER WORMS

Fill in the missing numbers to complete these number worms.



SHUTTER BUG

Wendy's dad has decided to buy a 35 mm camera for next summer's family vacation. After much "research" reading photography magazines and books, listening to the advice of friends who already own 35 mm cameras and catching the many "great features" of the different cameras advertized on TV, Wendy's dad has decided on THE camera he feels is best for his family. His main decision rested on buying an outfit that he could conveniently add to later on as he learned how to take better pictures.

Once the choice of *which* camera was made, the next step was to decide just *where to buy* the outfit. There are several camera stores in Wendy's town, so she and her dad spent one Saturday morning checking them all out. The prices were pretty much the same and all stores seemed to offer the "very best of service." Below are the quoted prices in each of the three stores visited.

Monty's Cameraland

camera body...$289.95; additional charge for f1.4 lens...$45.00; f111 electronic flash attachment....$48.95; action case $20.00; AZ-1 telephoto lens...$109.95; ultraviolet filter...$8.95.

Camera King

camera body...$279.95; additional charge for f1.4 lens...f111 electronic flash attachment....$45.95; action case...$18.95; AZ-1 telephoto lens...$113.95; an ultraviolet filter...$5.95.

The Zoom Zone

...offered this weekend package special which included the camera body, the f1.4 lens and the action case for $339.95. The f111 electronic flash attachment sells for $49.95 and the AZ-1 telephoto lens for $110.00. The sales offered to "throw in" the ultraviolet filter.

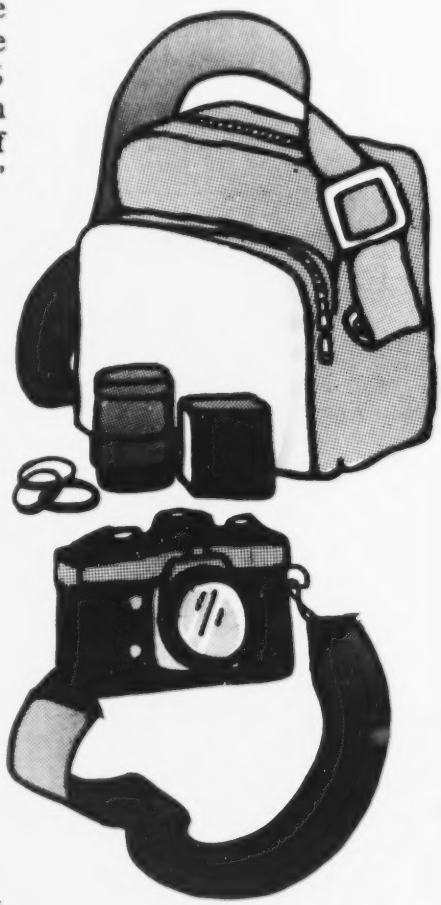
Calculate the total cost for each of these camera "deals." Be sure to also add on the 5 percent for sales tax.

SHUTTER BUG (continued)

Wendy and her dad then went home to figure out the "best deal." They were looking through one of the photography magazines and came across the advertisement below from the 41st Street Photo.

Camera body...$249.95; extra charge for the f1.4 lens...$40; AZ-1 telephoto lens...$105.00; action case...$20; f111 electronic flash attachment...$39.95; ultraviolet filter...$5.95.

To find out more, Wendy's dad called a toll free 800 number. He was told that there would also be the added advantage of not having to pay the 5% sales tax they would have to pay if they bought in town. There would, however, be insurance costs of $7.50 plus $3.50 for shipping "action express" (air) and $2.00 more for processing the order.



Aside from price, what other considerations should she and her dad make before buying?

What are the advantages of buying "in town"?

What are the disadvantages in this case?

What advantages does the mail order idea offer?

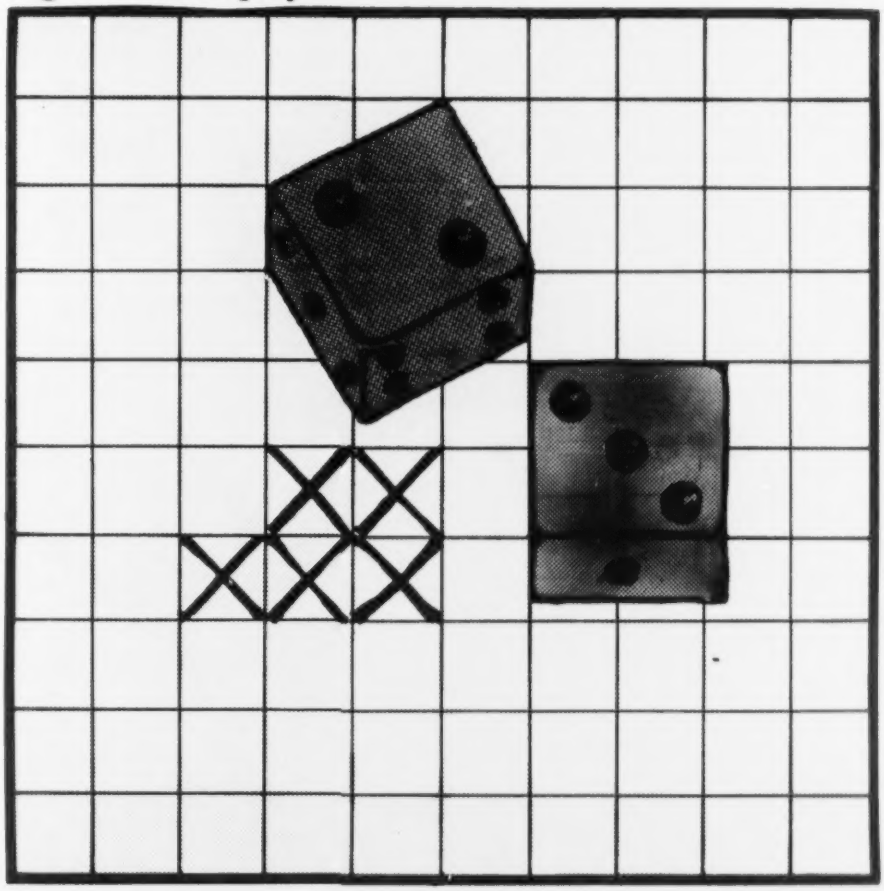
What are its disadvantages?

Considering all of the above information, what choice should Wendy and her dad make in buying a camera?

X-OUT

To play this game you will need some graph paper that is cut into squares containing 100 of the smaller squares each (10 x 10). Each player will need one of these sheets to use as a game board. He will also need a felt tipped marking pen and a pair of dice.

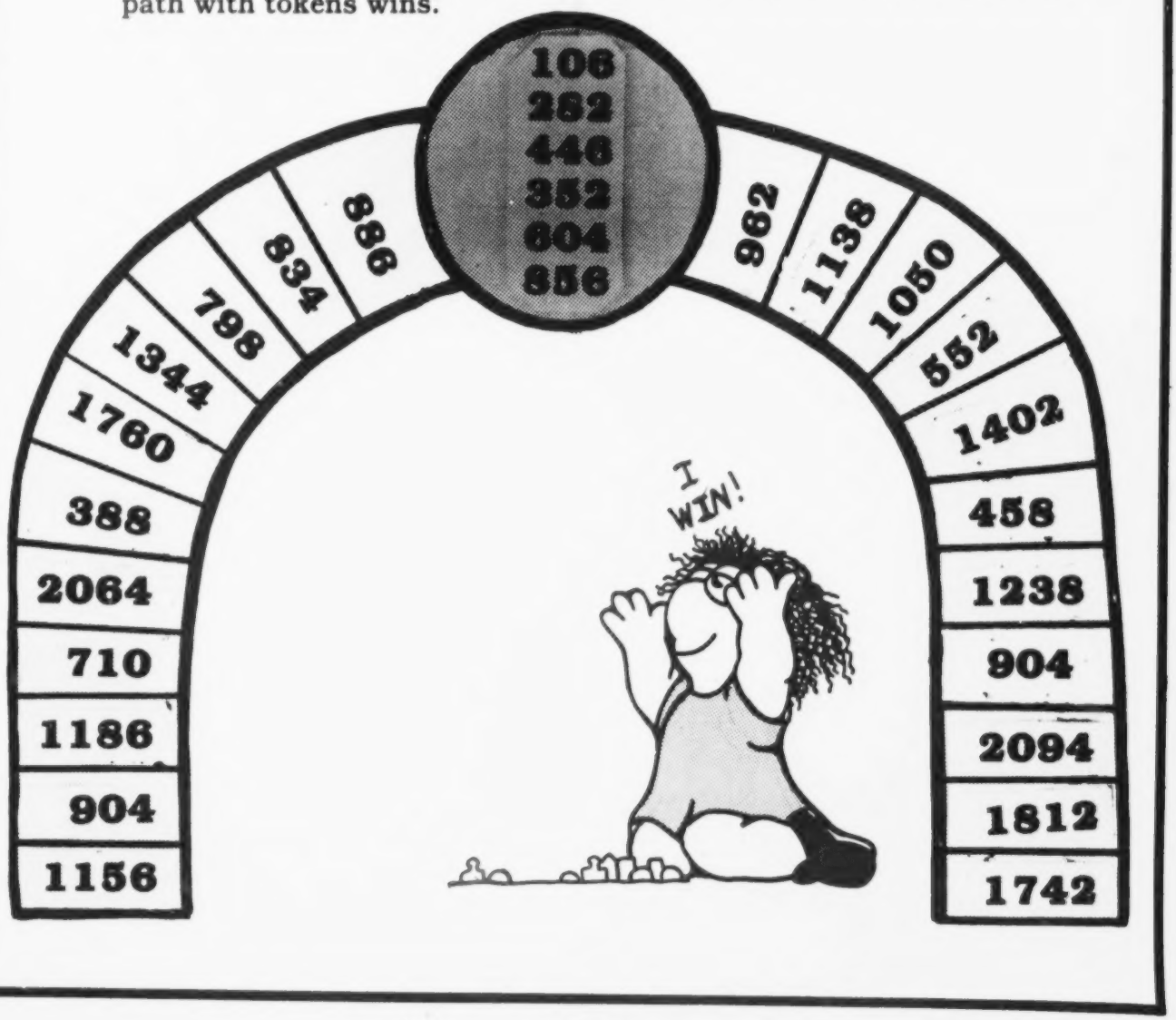
To begin,players all roll the dice to determine order of play (with high roll going first). Player A then rolls the dice. He adds the two together and crosses out the same number of spaces as in the combined total of the dice roll. Other players must mentally do the same to "check the opposition." The first player to cross out all of his boxes wins. Near the end of the game players must roll the *exact* number of spaces remaining in order to play.



If, for example, Player A rolls a two and three as shown, he would cross out five boxes on his game board. Near the end of the game, he may have four spaces left blank. To win, that player would have to roll exactly a four. Any other roll would not permit him to play and the dice would advance to the next player.

CROSSING PATHS

Construct a game board similar to the one below. Cover with Con-Tact paper to ensure durability. Players will also need several tokens and scratch paper. In the center of the game board there are six numbers. Players may choose to add any combination of these numbers. This game is to be played by two players. To begin the game each player selects one of the paths leading away from the center. Player A then adds any combination of the numbers in the center. If the sum results in one of the totals on his path, he may place a token on that number. If the total is found on the path of his opponent, the opponent gets to place a token on the number. There are obviously some combinations not found on either path. Players alternate taking turns and making choices of addends. The first player to cover all numbers on his or her path with tokens wins.

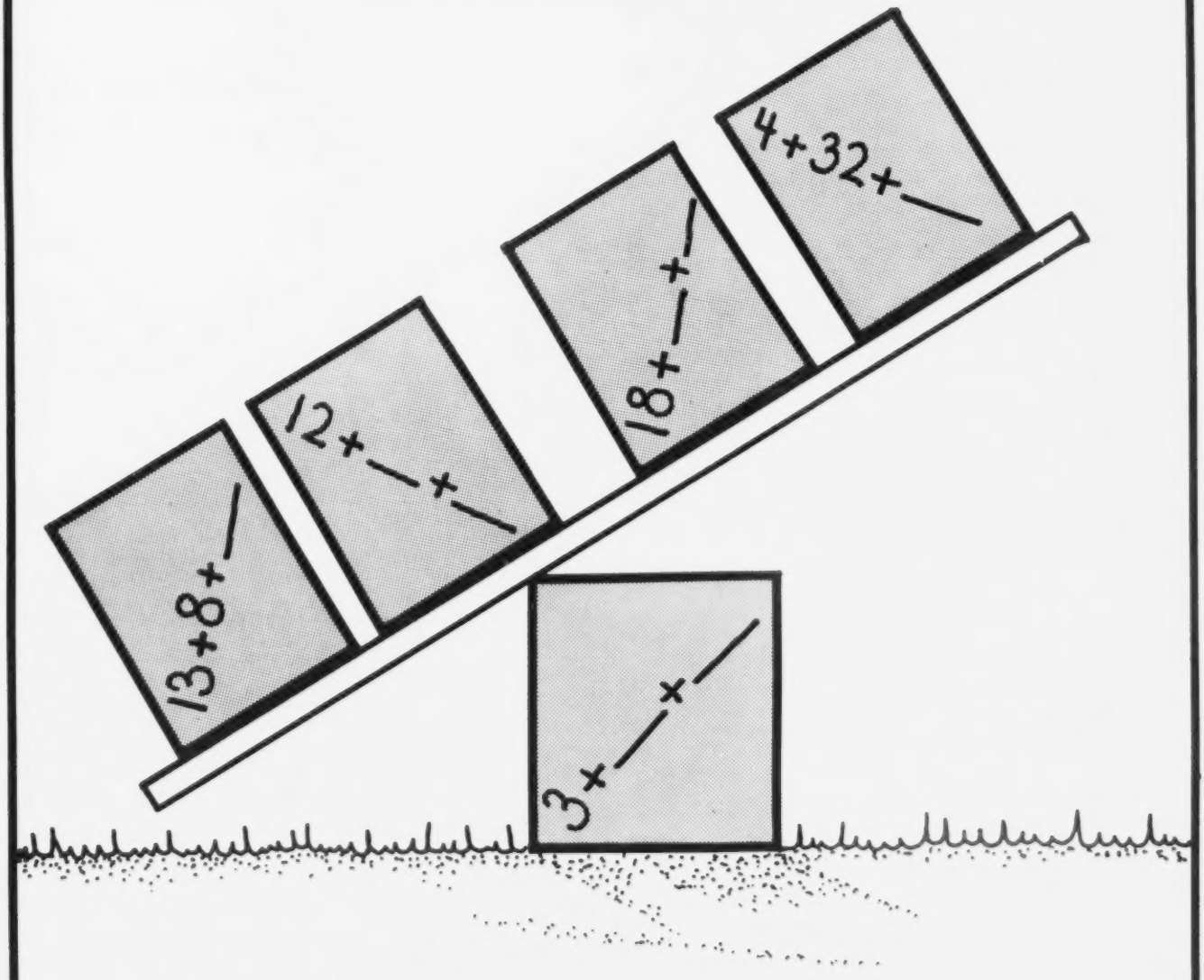


BALANCING BOXES

Balance the boxes below so that they all contain three numbers...the sum of which is the same for each box. Two of the boxes already contain two numbers, so they will need only one number each. The other three boxes contain only one number each, so each of these boxes will need two numbers.

Choose from the list of numbers below. You may use each number only one time...and you will have just enough numbers to complete all the boxes and make them equal.

2, 5, 10, 14, 15, 16, 17, 21



INDEPENDENT STUDY CARDS (animals)

GROUPS OF ANIMALS

A large number of kangaroos gathered together

617	63	496	1089	346
363	812	340	95	690
547	78	79	341	999
O	P	T	U	R
915	2035	1527	1525	953

GROUPS OF ANIMALS

A gathering of geese

319	19	436	688	982	436
444	999	519	488	46	886
819	319	83	87	506	402
G	I	G	E	G	A
1038	1724	1534	1582	1337	1263

GROUPS OF ANIMALS

Turkeys grouped together

66	813	552	742	111	88
88	409	6	918	223	919
119	737	78	1078	599	202
39	412	348	309	17	727
E	F	A	R	R	T
950	984	2371	1936	312	3047

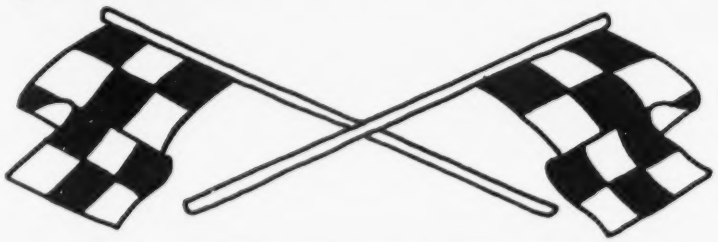
GROUPS OF ANIMALS

Many, many wise owls all gathered together

413	36	182	139	809
583	42	46	239	1012
919	912	312	593	780
836	3	299	618	309
707	967	119	101	1007
L	P	M	T	N
436	605	866	166	380
398	300	1205	342	200
599	19	309	981	0
605	509	433	134	400
119	286	604	314	909
A	A	I	R	E
1960	1719	193-	3458	3417	3157	958	1889	3917	1690

_____ **is hereby awarded the CHECKERED FLAG**

for finishing ahead of time in math.



_____

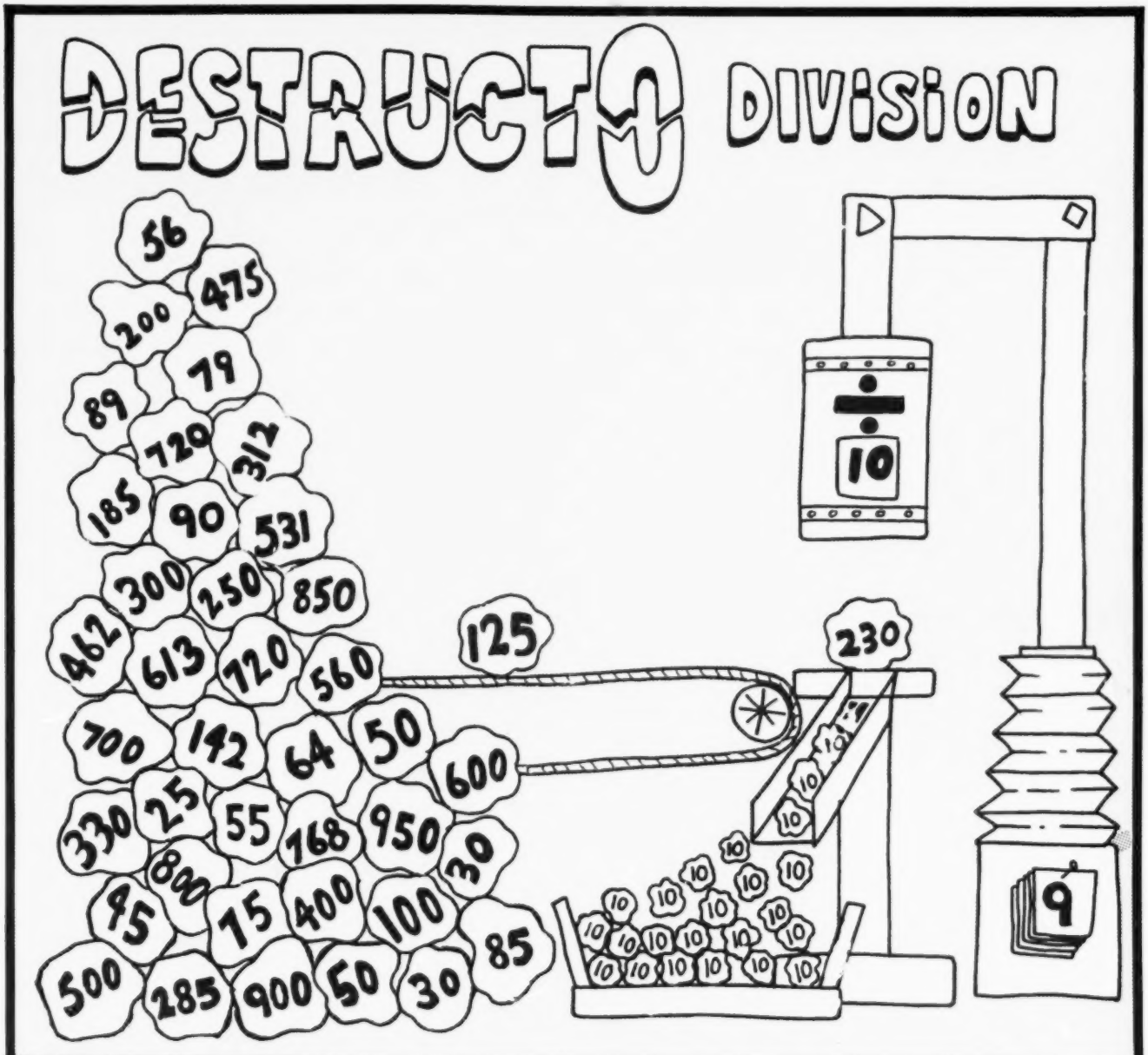
(teacher)

_____ **WINS**

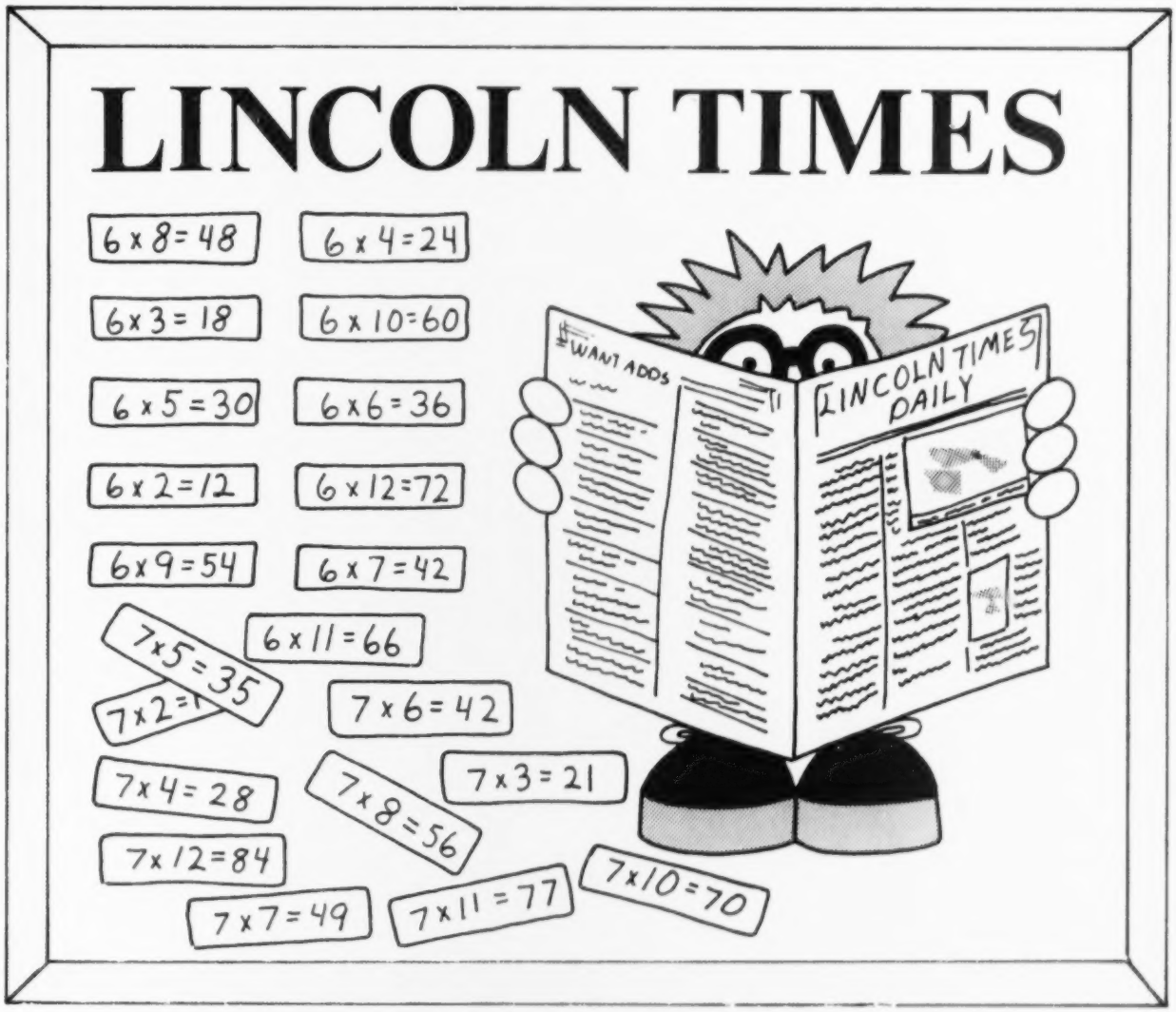
the BUSY BEAVER AWARD for work in math.

_____

(TEACHER)



Make the background of this bulletin board out of a light colored construction paper or posterboard. The idea is for the teacher to show children the mechanics involved in the process of division. The large rocks serve as the dividends, so be certain that they can be evenly divided. Choose one of the factors to serve as the "crusher" on the machine. The other factor shows the number of smaller rocks (the quotient) that result when the actual division takes place. Another possible use of this bulletin board would be for the teacher to develop the "crusher" and choose the large rock (dividend); then let the students tell how many smaller rocks would result.

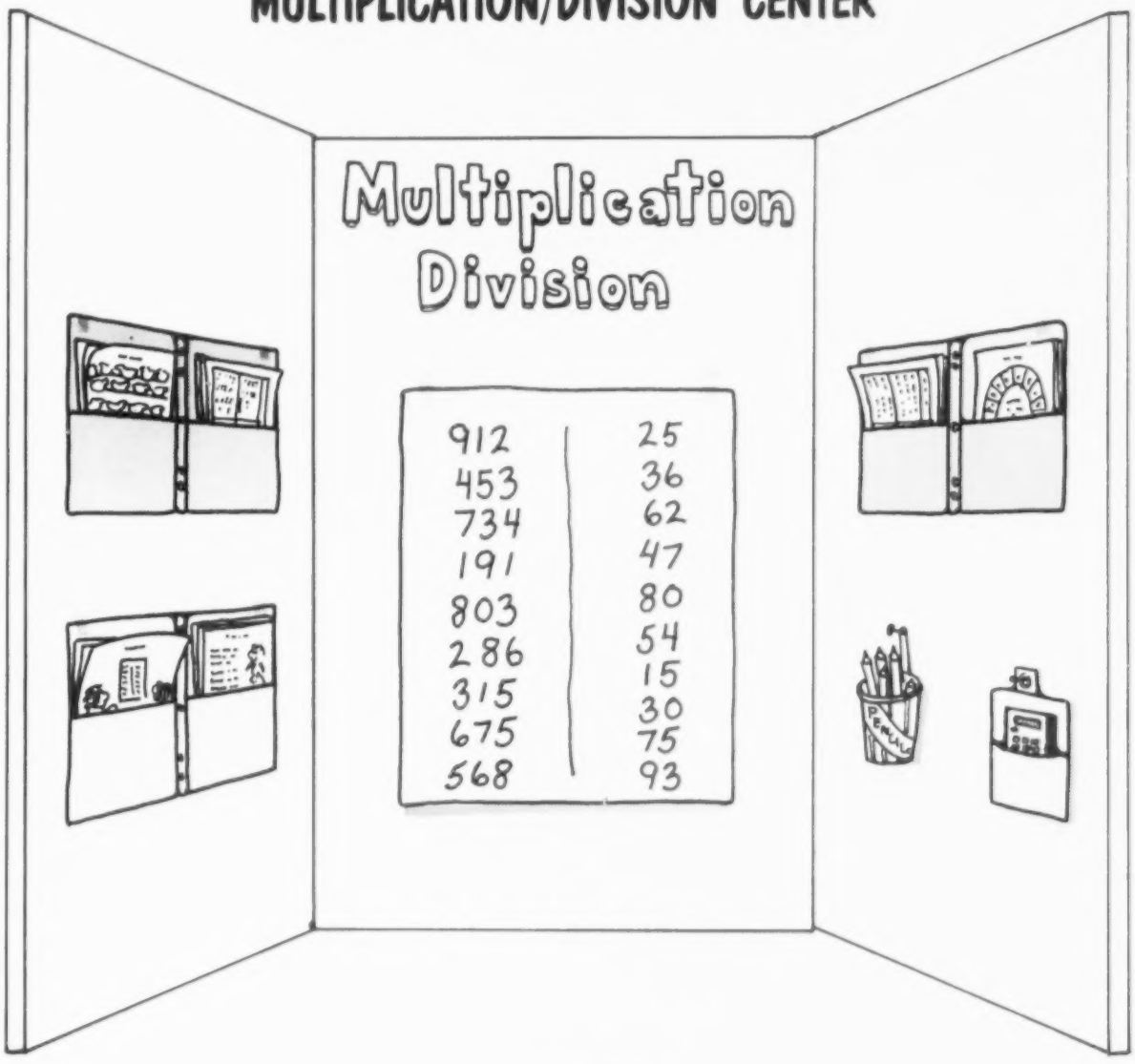


Make the background for this bulletin board out of a light colored construction paper or tag board. You can use any newspaper for the newspaper in the foreground, but it creates a greater impact on the students if you use a copy of the school newspaper. The title should also reflect your particular school.

The letters for the title can either be made from colored construction paper or old newspapers pasted down and outlined with a black felt tipped marker.

Place flash cards at random over rest of board. This board makes an excellent addition to your multiplication/division learning center, since it is mainly an attention-catching board.

MULTIPLICATION/DIVISION CENTER

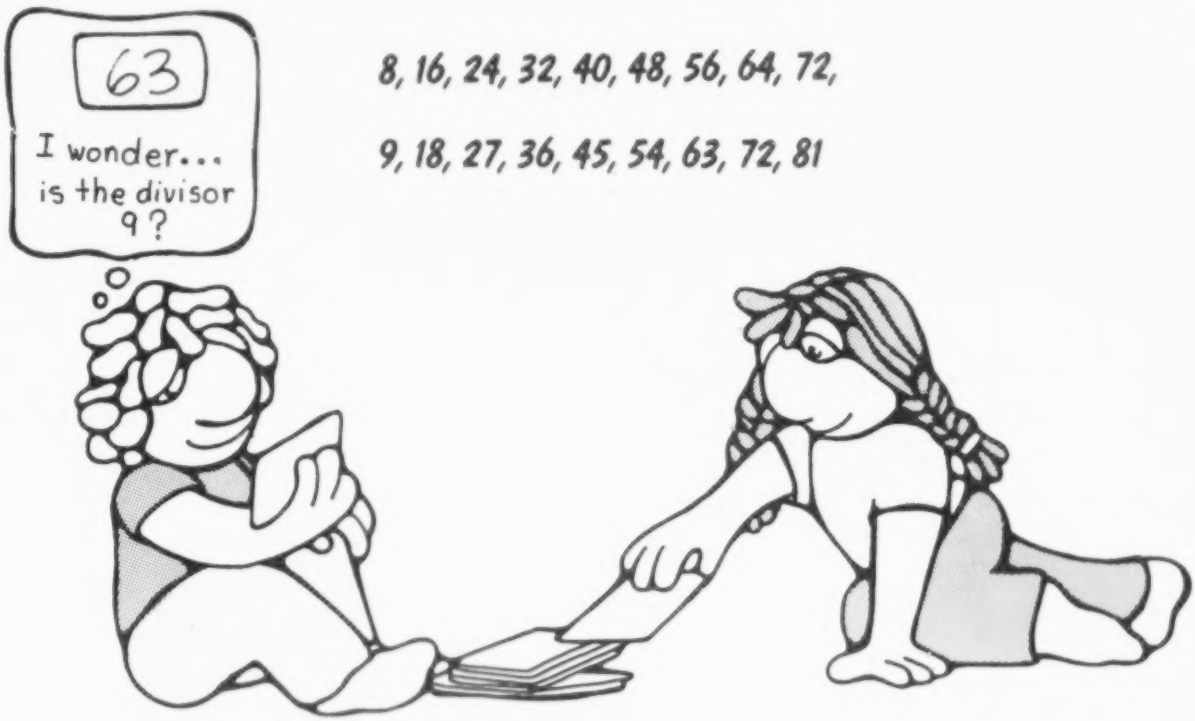


After covering gameboards with Con-Tact paper to ensure durability, it's also a good idea to place all gameboards and pieces into separate folders. Use regular file folders and staple at both ends to keep each game or idea intact. Attach instructions for playing the game or completing the activity securely either on the inside of the folder or on the back. Stickers or pictures or decorative lettering also help to enhance the appeal of the learning center.

It is also appropriate to maintain a chart for use in cross checking those tasks which have been completed by each child in each learning center.

TIMES TO REMEMBER

This exercise is a good one for practicing one-digit division problems. Using 3 x 5 inch index cards, put one of the following numbers on each card with a black felt-tipped marking pen:



8, 16, 24, 32, 40, 48, 56, 64, 72,

9, 18, 27, 36, 45, 54, 63, 72, 81

Shuffle the cards for a drill in division by 8 and 9. Players alternate choosing cards. When a player chooses a card, he then tries to think of both the dividend and the quotient that will answer the dividend. For example, if he draws a 63, he then must reflect on whether the divisor is 8 or 9. This creates a "flash" review of the 8 and 9 multiplication tables. Hopefully, the student will associate 63 with the 9's and come up with a quotient of 7. The other player obviously serves as checker (getting the same type of practice). It's better to play this game as a drill exercise than as a game with an actual winner.

The drill can be used for any of the multiplication tables singly, in groups of two; or perhaps near the end of the year, the dividends could include several of the multiplication tables.

DOUBLE YOUR PLEASURE

You've often heard the wise old statement about how ..."a penny that is saved is a penny earned." But, since a penny doesn't really buy very much these days, perhaps you didn't pay much attention to it. If so, then try this statement: "A penny doubled each day makes a man *very, very* rich!" In fact you might be really amazed at just how much money you could accumulate in just one month (30 days) if you doubled your money every day. Let's just see how much.

As you look at the examples in the chart below, you aren't going to believe this is true. So you'll just have to finish the chart to really find out.

You can use scratch paper to figure your answers when they get into really big numbers. Then put down all your findings in the chart below. Along about the 20th or 21st day you'll begin to see how really big this is going to get.

DAY	AMOUNT OF $	DAY	AMOUNT OF $
1	.01	16	
2	.02	17	
3	.04	18	
4	.08	19	
5	.16	20	
6		21	
7		22	
8		23	
9		24	
10		25	
11		26	
12		27	
13		28	
14		29	
15		30	

WOW!

Makes you want to start saving your pennies, doesn't it?

MAGIC SQUARES

Work these magic squares so that when you multiply two of the numbers either down or across, you get the third as a product.

1

2	8	
16		32

2

	3	
1		15
5		

3

6		18
	1	
3		

4

	2	
3	1	
		54

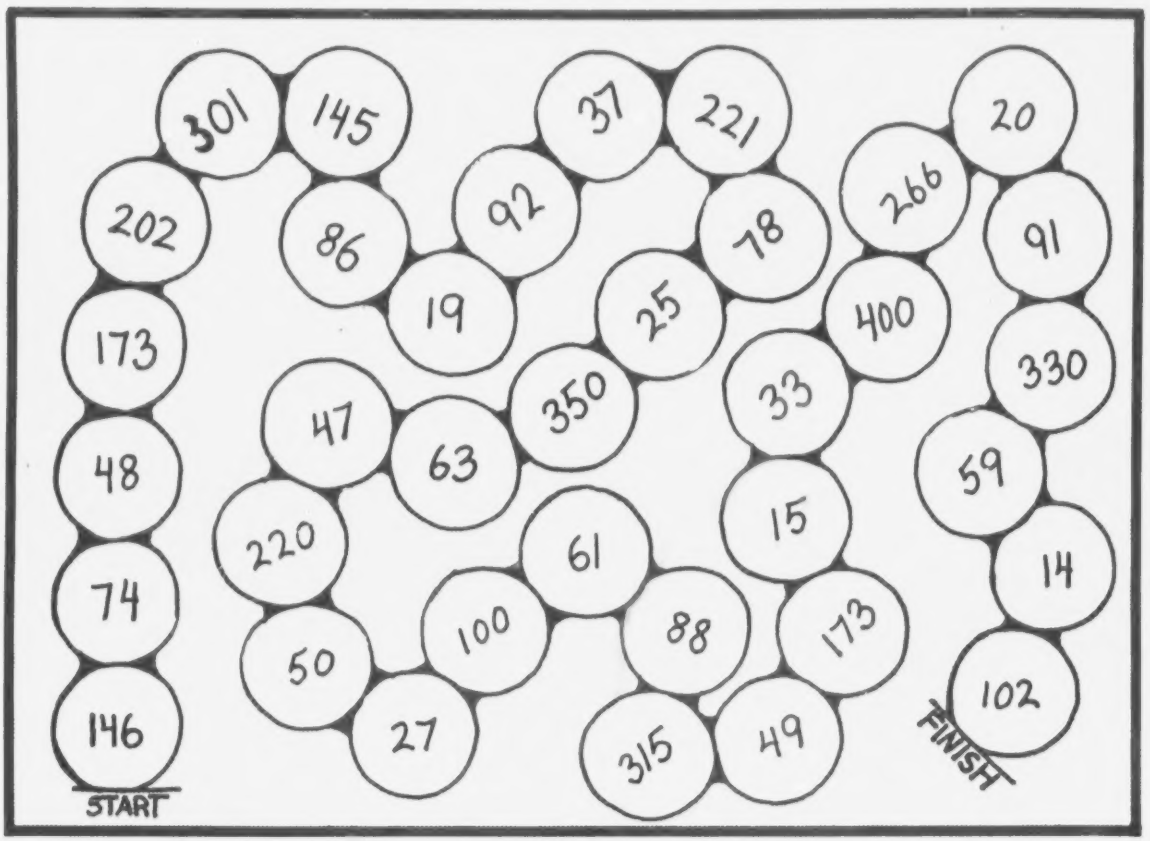
5

3	3	
	6	6

RUNNING REMAINDERS

Construct a game board similar to the one below. To play this game, players need one pair of dice, a token for each player and scratch paper for each player. Players roll dice to determine the order of play. The high roller begins the game by rolling the dice, then adding the two together. This number becomes the divisor. The number on the board where the player is located serves as the *dividend*. The player then performs the division on scratch paper and moves the number of spaces indicated in the remainder of the quotient.

If, for example, the first player rolls a 6 and a 5 (or a total of 11), the problem is one of dividing 146 by 11. This yields a quotient of 13 with a remainder of 3. The player would then move his token three spaces and play advances to the next player. The next time it is his turn, he will roll again and divide 173 by whatever divisor is indicated by the dice. If a player works a problem which doesn't yield any remainder, then his token does not move until his next turn. The first player to reach the finish line is the winner.



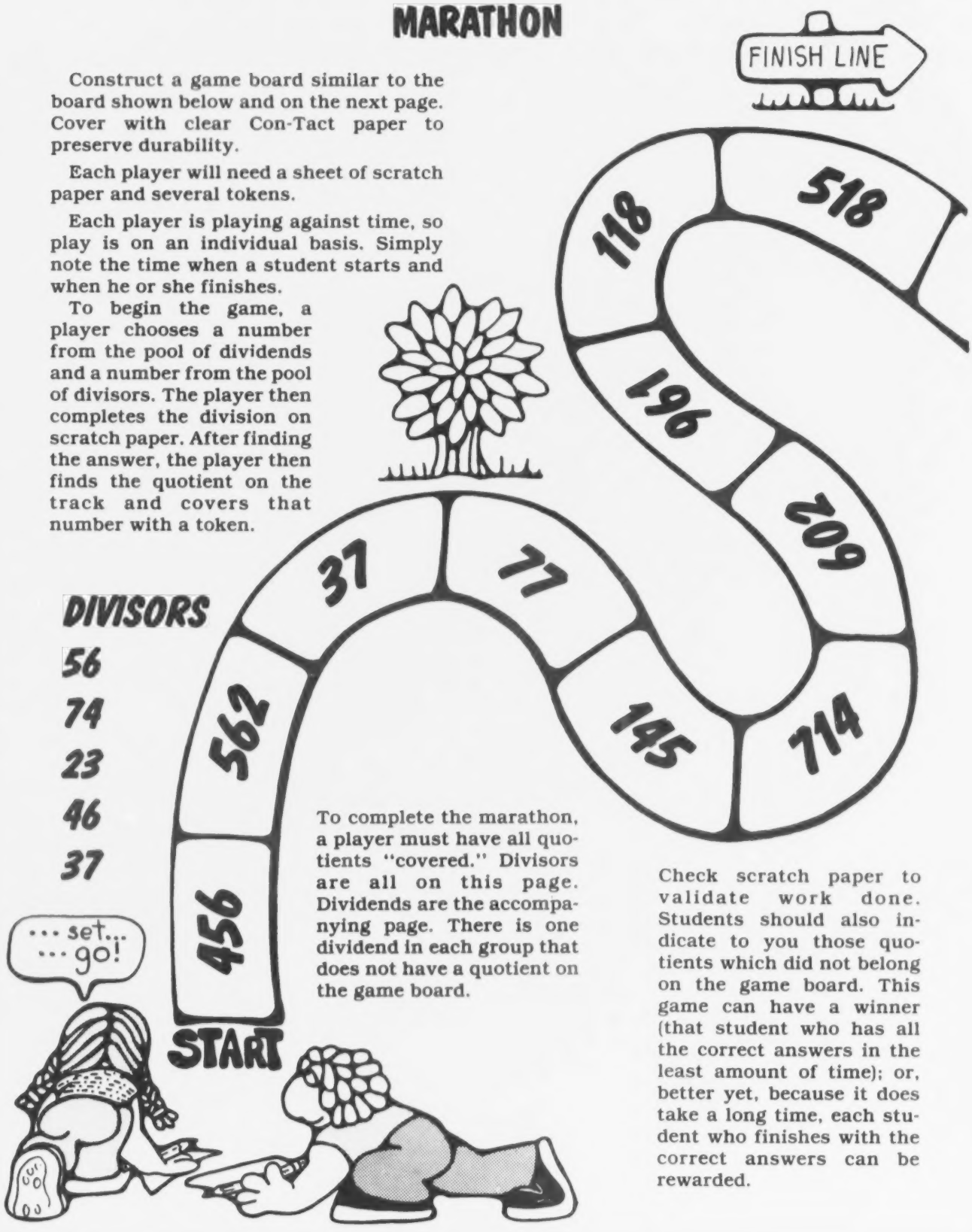
MARATHON

Construct a game board similar to the board shown below and on the next page. Cover with clear Con-Tact paper to preserve durability.

Each player will need a sheet of scratch paper and several tokens.

Each player is playing against time, so play is on an individual basis. Simply note the time when a student starts and when he or she finishes.

To begin the game, a player chooses a number from the pool of dividends and a number from the pool of divisors. The player then completes the division on scratch paper. After finding the answer, the player then finds the quotient on the track and covers that number with a token.



To complete the marathon, a player must have all quotients "covered." Divisors are all on this page. Dividends are the accompanying page. There is one dividend in each group that does not have a quotient on the game board.

Check scratch paper to validate work done. Students should also indicate to you those quotients which did not belong on the game board. This game can have a winner (that student who has all the correct answers in the least amount of time); or, better yet, because it does take a long time, each student who finishes with the correct answers can be rewarded.

MARATHON (continued)

with 56 as divisor

22904
28896
40264
36744
50400
22064

with 74 as divisor

2738 9866
63048 38332
10730 44474

with 23 as divisor

9568 13846
21965 12926
5382 2714

with 46 as divisor

3542 4692
44206 4554
7856 32844

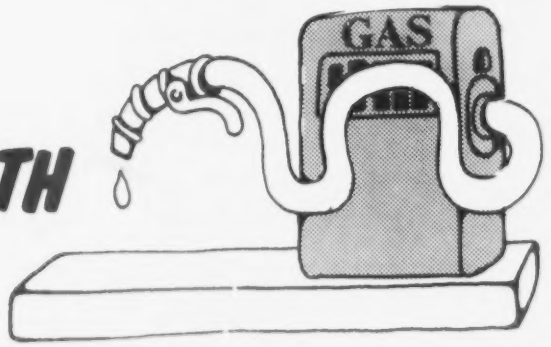
852
102
516
901
955
88
410
409
99
109
900
719
416
18
394
FINISH

Another way to play this game is to allow students the use of a hand-held calculator. It doesn't provide much practice in long division, but it's a lot more fun for kids!

with 37 as divisor

33337 4598
16872 3256
15170 666

MILEAGE MATH

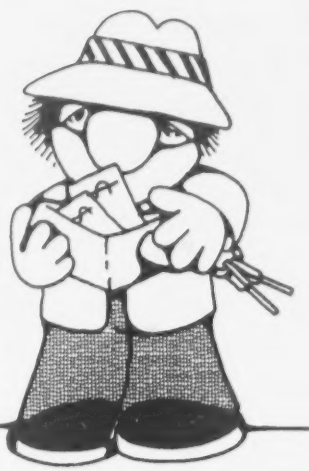


Compute the cost of a tank full of gas. The tank holds 22 gallons and the gasoline costs $1.36/gallon for the unleaded fuel it requires. If the tank is completely empty, how much would it cost to fill it up?

If this car can travel 495 miles on that tank of gas, how many miles per gallon is the car getting? This *miles per gallon* figure is really important to car owners.

Once you've finished figuring the *miles per gallon*, compute the cost of the gasoline per mile. Do this by dividing the total cost of the gas by the number of miles traveled.

Car owners are very much concerned about how far their cars will go on a tank of gas these days. That just makes sense, because the farther they can go per tank, the less it's going to cost them to get there.



MILEAGE MATH (continued)

What are some things people who own cars can do to lessen the cost of their trips? (slow down, go less often, have car pools, buy smaller cars, etc.)

_____

_____

_____

What effect do you suppose driving 55 miles per hour has on the *miles per gallon* when compared to a car that is going 65 miles per hour?

Do you suppose the slower car gets *better mileage*?

What other advantages does the slower driver have over the driver going 65 miles per hour?

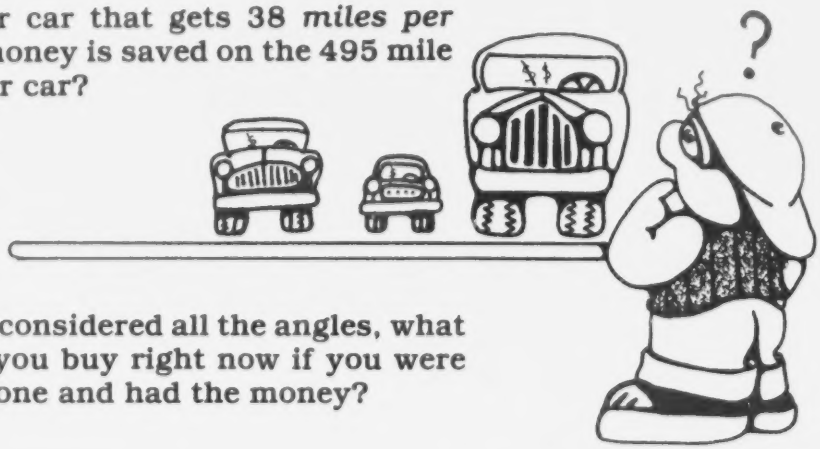
Millions of Americans have been buying smaller cars simply because they get better gas mileage. What advantage does a bigger car have over a small car?

_____

_____

_____

If we buy a smaller car that gets 38 *miles per gallon*, how much money is saved on the 495 mile trip with the smaller car?



Now that you have considered all the angles, what type of car would you buy right now if you were old enough to buy one and had the money?

SHADY OAKS COUNTRY CLUB

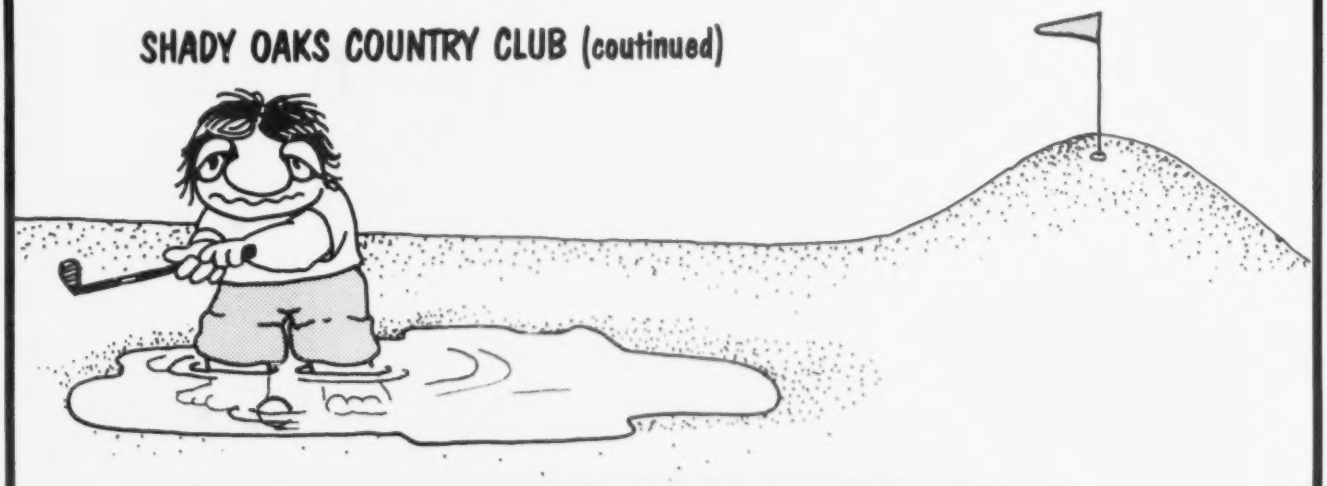
This game can be played by two, three or four players.

To play the game you need a scorecard and a pair of dice.

HOLE	PAR	FRONT 9			HOLE	PAR	BACK 9		
1	4				10	4			
2	3				11	4			
3	3				12	4			
4	4				13	3			
5	4				14	4			
6	5				15	4			
7	4				16	4			
8	4				17	3			
9	4				18	5			
	+ 35					+35 70			

Each "hole" presents a math problem that can be solved by rolling the dice. The number of rolls necessary to complete the problem is the score for that hole.

SHADY OAKS COUNTRY CLUB (coutinued)



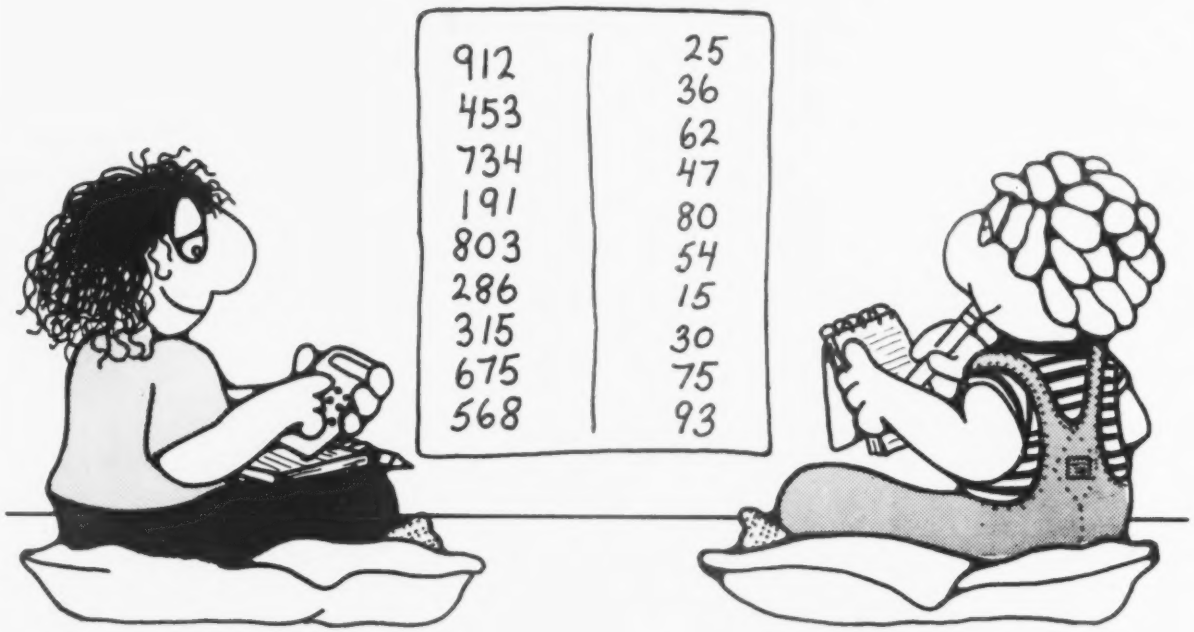
1st hole	Roll an "ace" on either cube
2nd hole	Roll a combination whose sum is greater than 10
3rd hole	Roll a combination that totals exactly 7
4th hole	Roll a combination that...when multiplied...yields a product of 24
5th hole	Roll a combination whose sum is divisible by two
6th hole	Roll a combination whose sum is exactly 5
7th hole	Roll a combination which has one die that can be divided evenly by the other die
8th hole	Roll a combination which will result in a fraction that can be further reduced
9th hole	Roll a combination whose sum is exactly 4

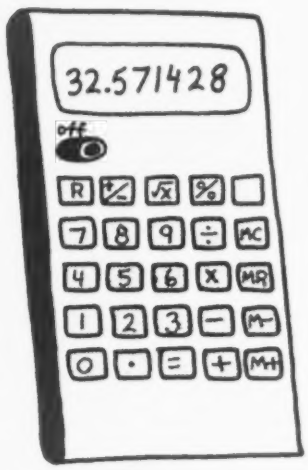
10th hole	Roll a combination whose sum total is evenly divisible by 4
11th hole	Roll a combination that...when one number is subtracted from the other...the result is a difference of 2
12th hole	Roll a combination which...when multiplied...can be divided evenly by 5
13th hole	Roll a double number (both the same)
14th hole	Roll a combination in which neither number can be divided evenly by 2
15th hole	Roll a combination which...when multiplied together...results in a product that is greater than 24
16th hole	Roll a combination which...when multiplied...results in a product that is less than 6
17th hole	Roll a combination whose sum is exactly 10
18th hole	Roll a combination whose product is evenly divisible by 3

Players roll a single die to determine the order of play (high roll is first on the "tee"). The first player then rolls the dice until he completes the requirements of the first hole. He then records the number of rolls it took him to complete that first hole. Play then passes on to the second player. When all players have completed the first hole, they proceed on to the second hole, etc. At the end of each hole, that player with the lowest score on the previous hole plays first as he has the teeing "honor."

A round (game) can consist of either nine or eighteen holes. At the end of the agreed upon round, players total their scores. That player with the lowest score wins.

GUESSTIMATION





To play this game you need a calculator (from the learning center) plus some scratch paper for each player. Give students a list of two and three digit numbers plus another list containing one and two digit numbers. As students play the game, they use a number from the *larger number list* to serve as the dividend and a number from the *smaller number list* becomes the divisor.

Each player then takes a quick look at both divisor and dividend and estimates the approximate quotient. Both players write down their answers on the scratch paper. The whole idea is to come *closest* to the answer.

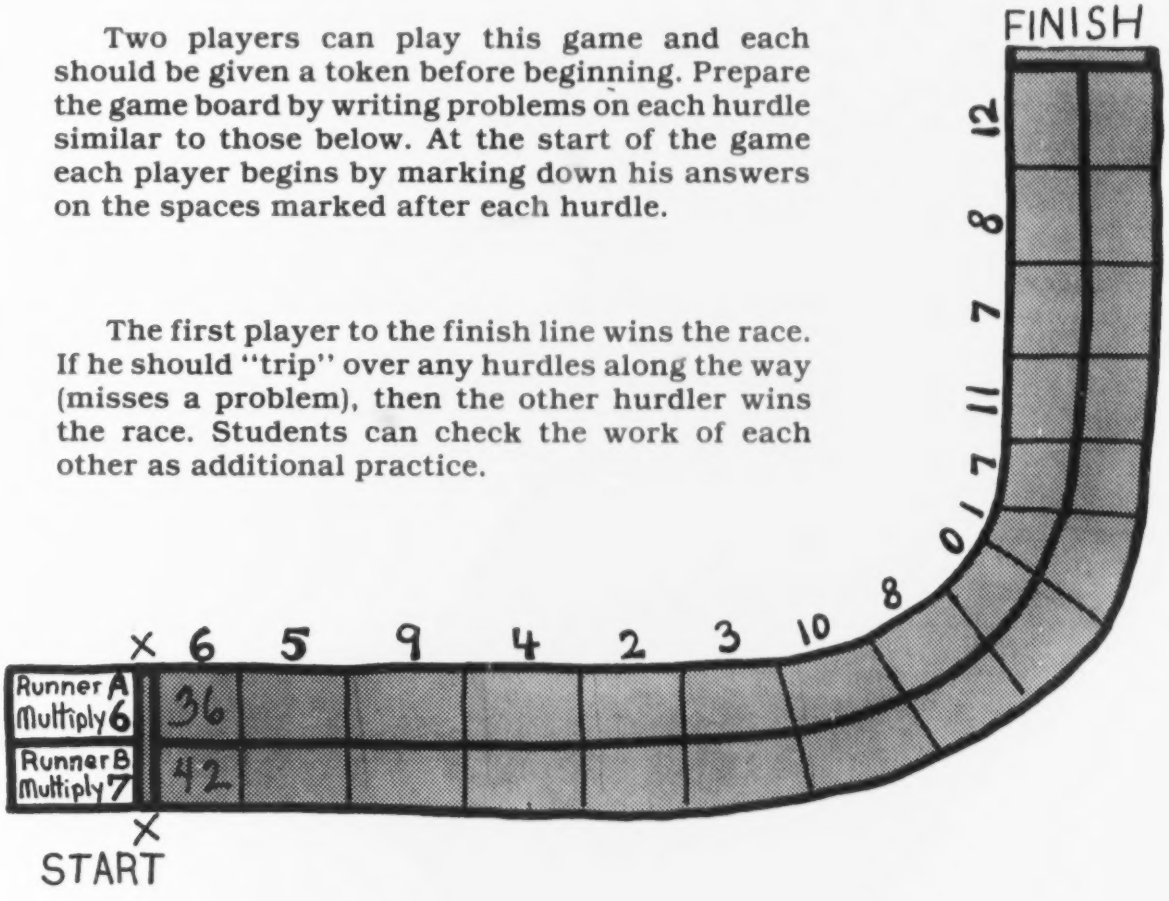
For example, if Player A "guesstimated" that 912 divided by 36 was about 28, he would divide the dividend (912) by his estimated answer (28) and get 32.571428 as an answer. He then subtracts the divisor (36) from this figure and gets a score of -3.428572. Let's say Player B thought that 912 divided by 36 would come closest to 24. She then divides the 912 by her chosen "guesstimate" of 24 and gets a result of 38. She then subtracts the divisor (36) from that number and gets 2.000. Player B's answer is closer to the real answer of 25 than Player A's answer....thus Player B wins that round.

CLEARING LOW HURDLES

Construct the game board of tagboard and cover with clear Con-Tact paper. Make spaces large enough to enable students to write in answers to problems easily. Provide grease pencils so that answers can be wiped clean and problems changed.

Two players can play this game and each should be given a token before beginning. Prepare the game board by writing problems on each hurdle similar to those below. At the start of the game each player begins by marking down his answers on the spaces marked after each hurdle.

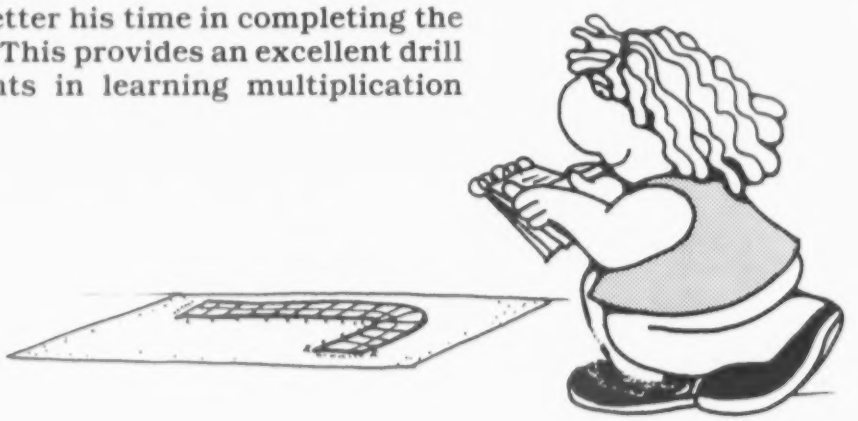
The first player to the finish line wins the race. If he should "trip" over any hurdles along the way (misses a problem), then the other hurdler wins the race. Students can check the work of each other as additional practice.



CLEARING LOW HURDLES (continued)

This same idea can be adapted for use by older children by simply making the problems more difficult. For example, 6 x 232, 6 x 541, etc. If you use the game this way, students should be given scratch paper for calculating their answers.

Play can also be on an individual basis with hurdler trying to better his time in completing the race over last time. This provides an excellent drill activity for students in learning multiplication tables.



CLASSIFIED MATH

WANT-ADS

HELP!

Earn extra spending $$$ after school stuffing envelopes. Fast worker will really "lick" this job. Piece work. 2 cents/ envelope.

How much can Tom and Bill earn in four hours if they average six envelopes per minute each?

FOR SALE

Slightly used 10-speed bicycle. Owner needs $$$ fast! $50 off original price of $120. Only five months old. Priced to sell now! Great deal!!

How much for the bicycle? How much per month did it cost the owner to have the bicycle if he can sell it for what he wants?

SAVE $$$$

Buy student season pass for only $5.50. See all 9 home games. Regular admission... $1.25 per game. Save $$$

How much do you save over whole season? What is cost per game?

FOR RENT

School gym available for rent on weekends and evenings. Put your group "on the run" for only $10/hour.

How much will it cost for three evenings per week for 2 hours each evening?

CHEERLEADER CAR WASH

Help girls go to cheerleading camp!
Duffy's Station, Saturday from 8-4. $2.50/car...$3.00/ truck...$5.00/bus

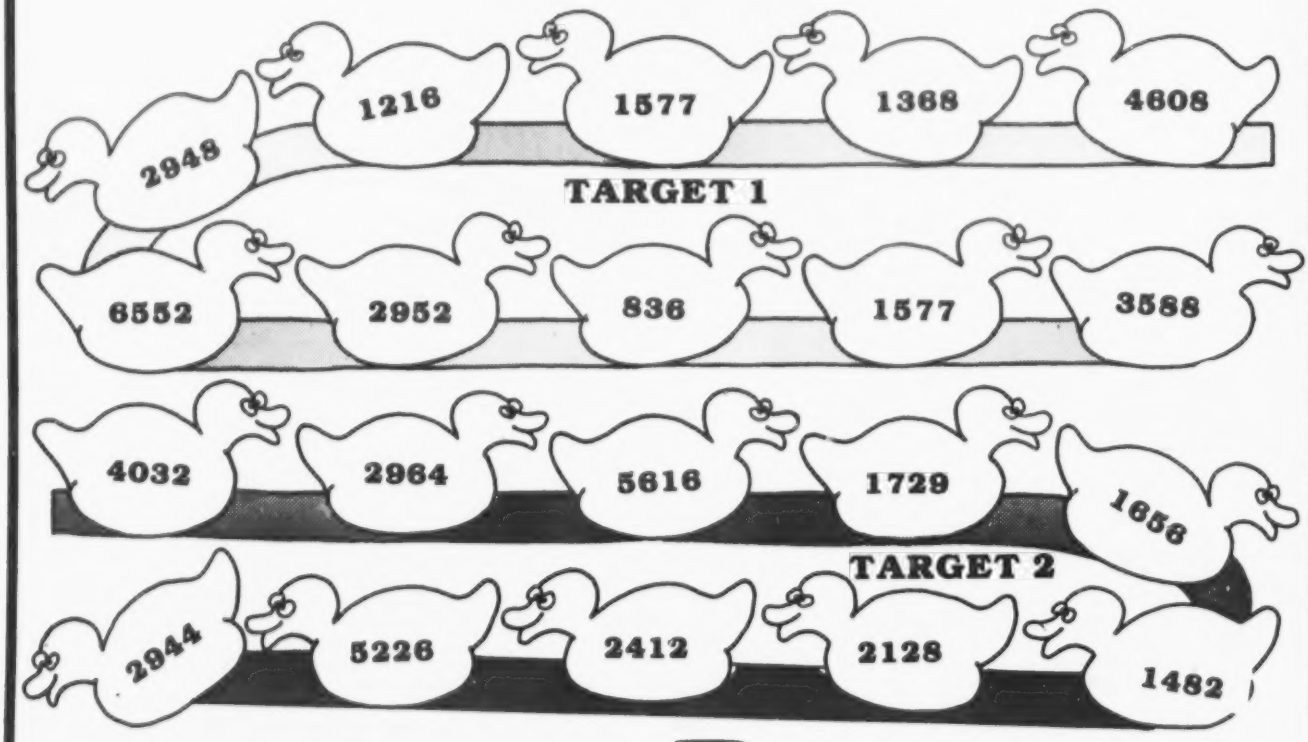
How much money if the girls wash 65 cars and 16 trucks?

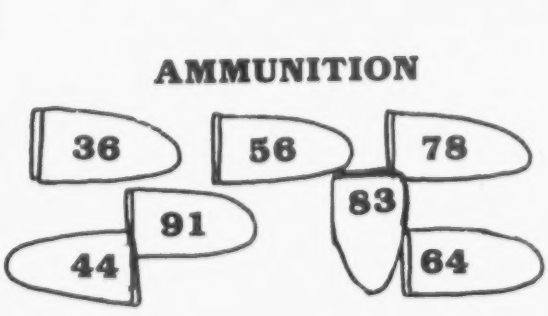
FOR LEASE

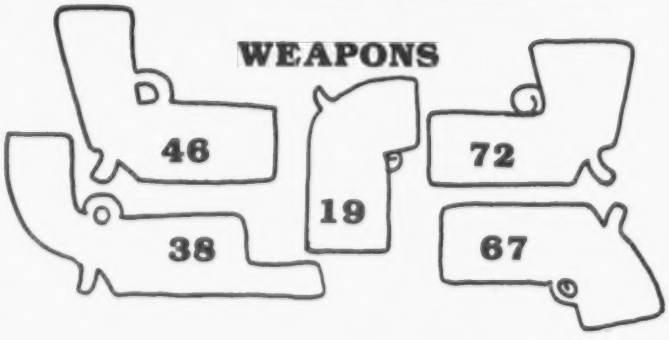
6th grade student willing to share old papers, tests, etc., with 5th grader. COMPLETE YEAR! Sit back and relax for only $1.50/week.

How much for this 36-week "education"?

DEAD DUCKS







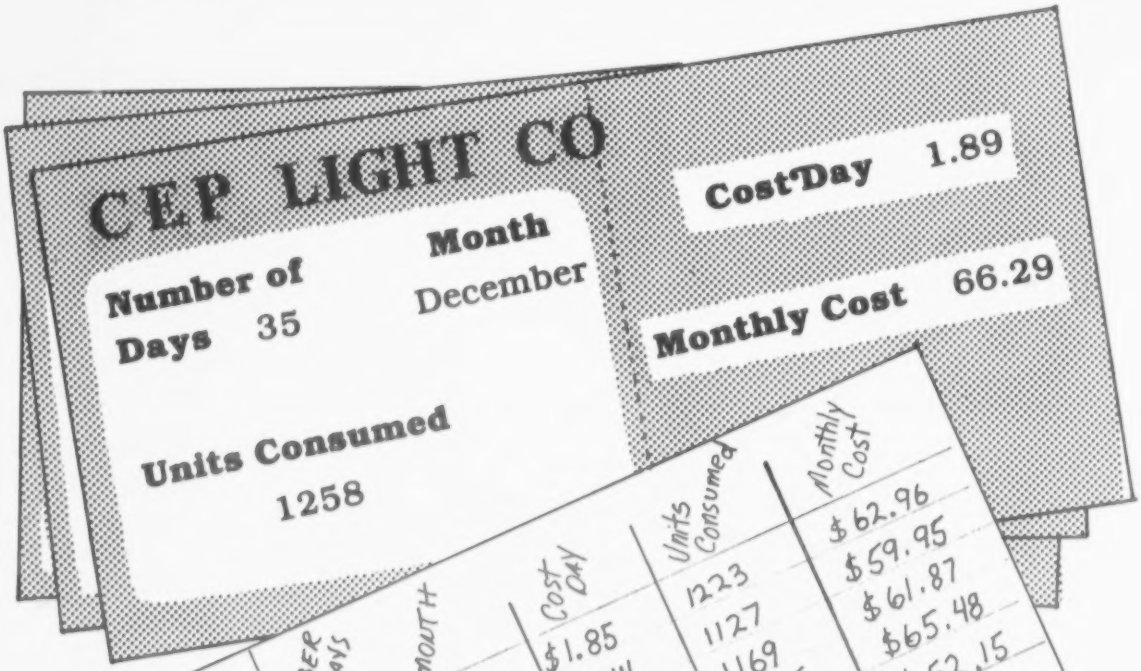
Reproduce this page and place on a ditto master for use in your multiplication-division learning center. This game is played between two players. Each will need a sheet of scratch paper and a pencil or a calculator.

The object of the game is for Player A to attempt to shoot all of Player B's ducks (Target 2) before Player B shoots all of his (Target 1).

To begin, Player A chooses one of the weapons plus a round of ammunition and then multiplies the two together. He does this privately either on a sheet of scratch paper (or on a calculator if you prefer). If the product is one of B's ducks, Player A places an X on that "dead duck." If the answer is one of his own ducks, Player A remains quiet. He certainly does *not* want to shoot down his own ducks. After all, in a shooting gallery, the object is to shoot down the *opponent's* ducks!

TURN OFF THE LIGHTS

Michael's parents received these electricity bills over the past year. Their main interest seemed to be the concern of just about everybody. How much does it all cost in dollars and cents? They thought that perhaps by looking at the "whole picture," they could get some ideas about where they could save some money. They asked Michael to help them look, too.



	Number of Days	Month	Cost/Day	Units Consumed	Monthly Cost
	34	January	$1.85	1223	$62.96
	28	February	$2.14	1127	$59.95
	28	March	$2.21	1169	$61.87
	33	April	$1.98	1235	$65.48
	29	May	$1.80	989	$52.15
	30	June	$2.03	966	$61.04
	28	July	$2.10	924	$58.83
	33	August	$2.30	1196	$75.90
	31	September	$1.88	924	$58.30
	28	October	$1.68	890	$47.13
	31	November	$1.66	979	$51.46
	35	December	$1.89	1258	$66.29

TURN OFF THE LIGHTS (continued)

Look at the bills. What was the total cost of electricity for the year?

_____

How many units were consumed over the course of the entire year?

_____

Why do you suppose the total number of days is not in accord with a regular calendar year?

_____

How many days were charged to the twelve months presented? _____

How much was the cost of electricity *per month*? _____

What was the *per day* cost of electricity for the entire year? _____

In which month were the most units of electricity consumed?

_____

In which month was the total bill the highest? _____

What could explain the fact that more units were used in December than in August, yet the bill was higher for August than for December?

_____

_____

Looking at all this information, what kind of conclusions can you reach?

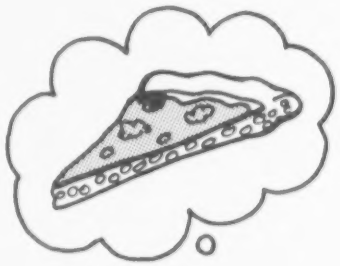
_____

Are there any ways where Michael and his parents might be able to cut the cost of their electricity bill? _____

_____

STEAMBOAT PIZZA PORT

Holly's parents gave her the choice of having "any kind of birthday party" she wants. Since her very favorite food is pizza, Holly has decided to invite her friends to a pizza party at the Steamboat Pizza Port.



Her list included eleven of her best friends. Holly's mother called all of the parents and found that all of the girls could come except Cindy, who was going to be out of town that night. Both of Holly's parents will be there plus her older sister (to take pictures). So, how many people are coming altogether? Why is it important to know how many are coming?

Holly's mom called the Steamboat Pizza Port to make the necessary reservations and to ask for a sample menu. The manager said they would be given an extra special "Birthday Room" free of charge. There would also be included without charge "Red Carpet Service" complete with party favors, free juke box music and sirens. Finally, there would even be a birthday cake complete with candles.

There would, however, be a charge of $.70 per serving for the "Double Header" (a two-dip sundae with a special topping). He also wanted to know the time of arrival, the number coming and the pizzas that would be ordered. His reason was that the Steamboat would go ahead and start the pizzas ahead of time. They would then be ready shortly after the group's arrival.

STEAMBOAT PIZZA PORT (continued)

Holly's mom received this menu in the next day's mail.

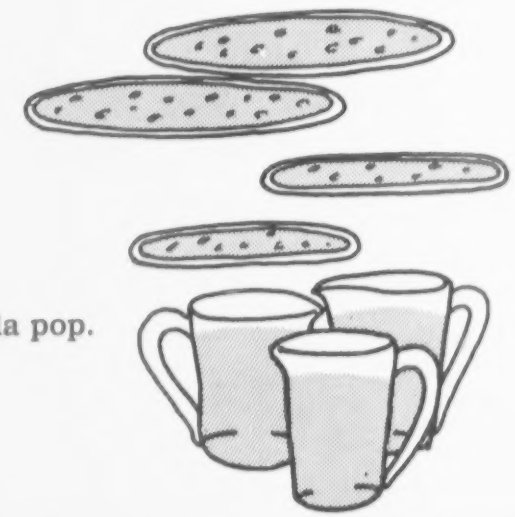
Steamboat Pizza Port

	10-inch	12-inch	14-inch
CHEESE	$2.90	$3.85	$4.25
GREEN PEPPER	3.50	4.40	5.25
SAUERKRAUT	3.50	4.40	5.25
ONION	3.50	4.40	5.25
ANCHOVY	3.50	4.40	5.25
PEPPERONI	3.50	4.40	5.25
MUSHROOM	3.50	4.40	5.25
HAMBURGER	3.50	4.40	5.25
SAUSAGE	3.50	4.40	5.25
HAM	3.50	4.40	5.25
CANADIAN BACON	3.50	4.40	5.25
GREEN OLIVE	3.50	4.40	5.25
TACO	4.50	5.50	6.50
TWO-ITEM PIZZA	3.75	4.60	5.50
STEAMBOAT SPECIAL	4.25	5.25	6.25
EXTRA ITEM	.40	.60	.90
DOUBLE DOUGH	.50	.50	1.00
STEAMBOAT DELUXE	5.25	6.50	7.50

Soft drinks are sold in quantities of $.50 each or by the pitcher for $1.75

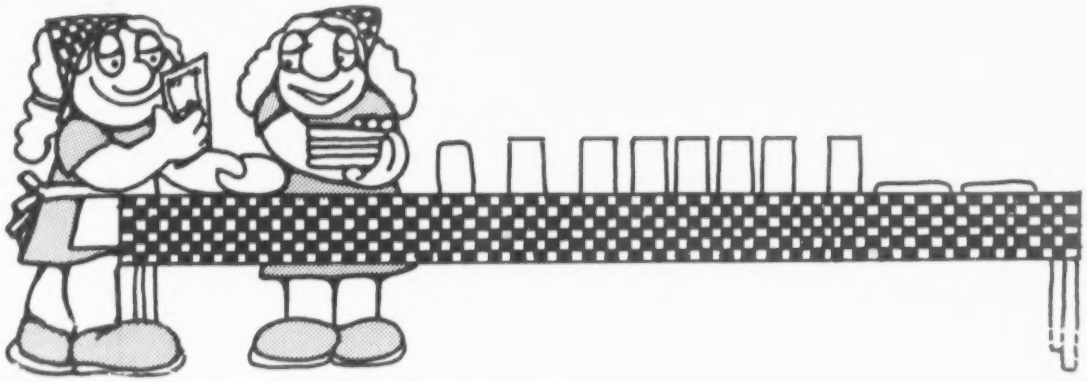
After looking it over, she and Holly decided how many pizzas to order. After some tough decision making on which kinds of pizza to order and how much, Holly's mom phoned in the following order:

1 large Sausage and Mushroom combination.
1 large Canadian Bacon
1 medium Taco
1 medium (½ Pepperoni and ½ Ham)



They also ordered three pitchers of soda pop.

STEAMBOAT PIZZA PORT (continued)



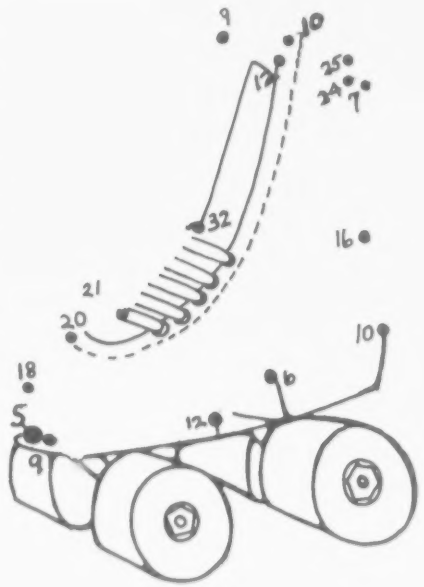
When the party was over, Holly's dad left the girl who served them a $5.00 tip for cleaning up their mess. Everyone also had a "Double Header." The sales tax amounts to 5% except for the tip. What was the total cost of Holly's birthday party?

Do your figuring here

After you've finished working out the costs of Holly's party, make up a party of your own using the same menu. After deciding how many will be in your party, decide what should be ordered and figure out the total cost. Be sure not to "under-order." You don't want friends leaving hungry. On the other hand, food is expensive today, and you don't want your party to cost your parents more than is necessary. Calculate the total cost including tax and tip. Then you can exchange your plans with other members of your class.

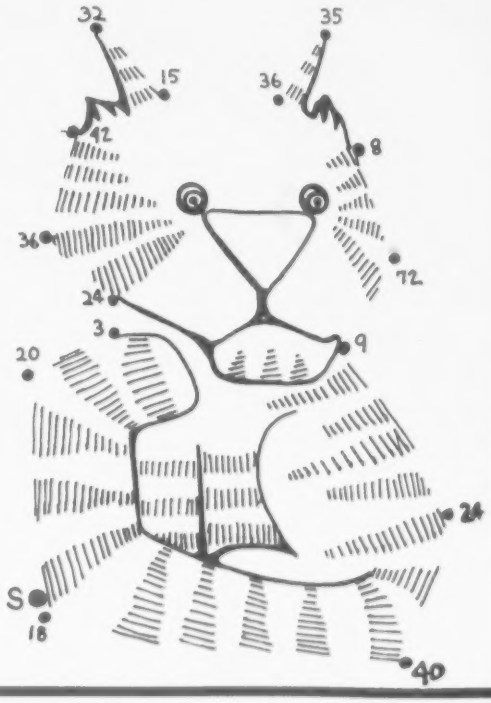
Find the answers for each of the following problems. After calculating the answers, begin at START position with a pencil and complete the drawing.

3 × 6
4 × 5
7 × 3
8 × 4
9 × 1
6 × 2
2 × 5
5 × 5
8 × 3
7 × 1
8 × 2
5 × 2
6 × 1
4 × 3
3 × 3



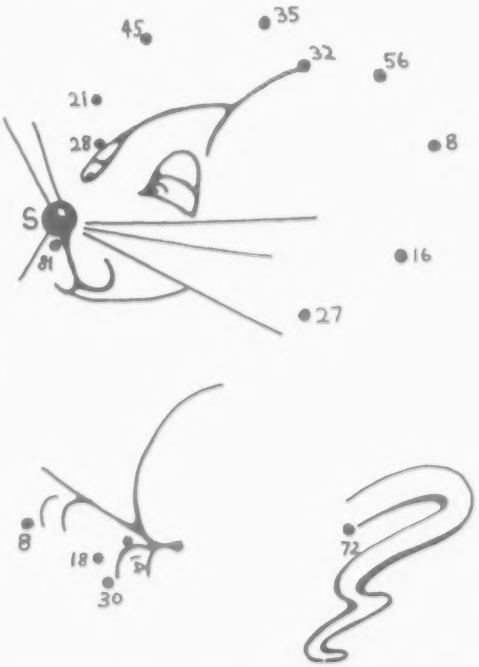
Find the answers for each of the following problems. After calculating the answers, begin at START position with a pencil and complete the drawing.

5 × 4
3 × 1
3 × 8
9 × 4
7 × 6
8 × 4
5 × 3
4 × 9
7 × 5
4 × 2
8 × 9
9 × 1
4 × 6
5 × 8
2 × 9
4 × 5



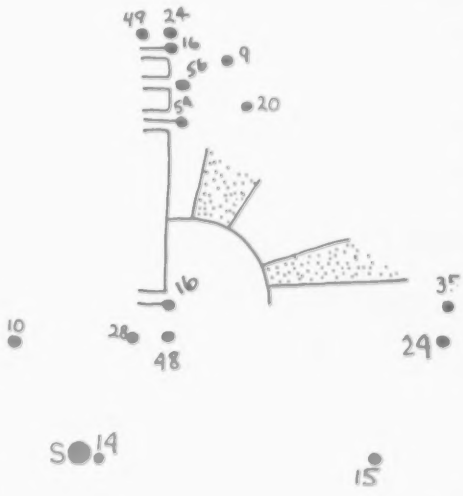
Find the answers for each of the following problems. After calculating the answers, begin at START position with a pencil and complete the drawing.

7 × 4
3 × 7
9 × 5
5 × 7
4 × 8
7 × 8
4 × 2
2 × 8
3 × 9
9 × 8
6 × 5
6 × 3
7 × 2
8 × 1
9 × 9



Find the answers for each of the following problems. After calculating the answers, begin at START position with a pencil and complete the drawing.

2 × 5
4 × 7
7 × 7
8 × 3
4 × 4
3 × 3
7 × 8
4 × 5
6 × 9
7 × 5
2 × 8
6 × 8
4 × 6
3 × 5
2 × 7



He was the American hero during the 1972 Olympic Games in Munich.

355	477	142	368	455	186	878	640	318

FIRST NAME

K	M	R	A
45)16560	88)3124	63)8946	18)8586

SURNAME

S	T	Z	P
99)45045	55)35200	74)23532	22)4092

I
21)18438

He won the 1980 New York Marathon in record time in his first marathon run ever.

341	262	453	777	124	985	422	123	188	177	455	356	95	210

FIRST NAME

L	R	B	A
42)11004	16)1984	26)11778	68)23188

E	O	T
12)9324	68)28696	49)48265

SURNAME

Z	A	S	L
14)4984	36)6768	85)10455	25)4425

A	A	R
98)9310	82)37310	67)14070

The World's Greatest Athlete during the 1976 Olympic Games in Montreal, Canada.

18	29	72	32	87	95	14	71	62	85	81

FIRST NAME

R	B	C	U
810)23490	963)17334	630)20160	321)23112

E
201)17487

SURNAME

N	J	N	R
255)18105	886)84170	174)10788	255)20655

E	E
332)4648	623)52955

He has won more money playing golf than anyone else.

89	63	41	52	13	78	11	33	52	22	61	14

FIRST NAME

J	K	C	A
418)37202	618)32136	633)25953	581)36603

SURNAME

K	S	U	N
567)18711	654)9156	825)50325	410)5330

I	L	C	A
60)4680	633)32916	111)1221	333)7326

THE END ZONE

the number of minutes in an NFL game
+ the number of quarters in a game
× the number of points for a safety
+ the number of points for a touchdown
× the number of points for a field goal
× the length of a football field in yards
+ the number of yards needed for a first down
× the number of teams in the NFL

Football Sport Shorts

DUGOUT DATA

number of bases in the diamond
× the number of innings in a game
÷ the number of umpires in a major league game
× the number of players on one team
÷ the number of bases covered in a single
÷ the number of bases covered in a double
÷ the number of bases covered in a triple
× the number of bases covered in a home run
× the number of teams in the major leagues
× the number of bases advanced in a Grand Slam

Baseball Sport Shorts

THE FIFTH FOUL

number of halves in a game
× the number of players on one team
× the length of a college game in minutes
× the distance of the free throw line
+ the number of referees in a game
+ the time limit when the ball must be brought over the center stripe
+ the number of seconds allowed before a team must shoot in the NBA
× the number of games a team must win to win a 16-team tournament

Basketball Sport Shorts

TEE TIME TRIVIA

the number of holes in a round
× the score for an "ace"
× the score for a bogey on a par 4 hole
× a score of birdie on a par 3 hole
÷ a score of eagle on a par 5 hole
× the maximum number of clubs one can carry
× the number of holes in a PGA tournament
× a double bogey on a par 4
÷ a double eagle on a par 5 hole
÷ the number of tournaments in the Grand Slam

Golf Sport Shorts

A BLUE RIBBON TO YOU _____

FOR EXCELLENT WORK IN MATH

_____

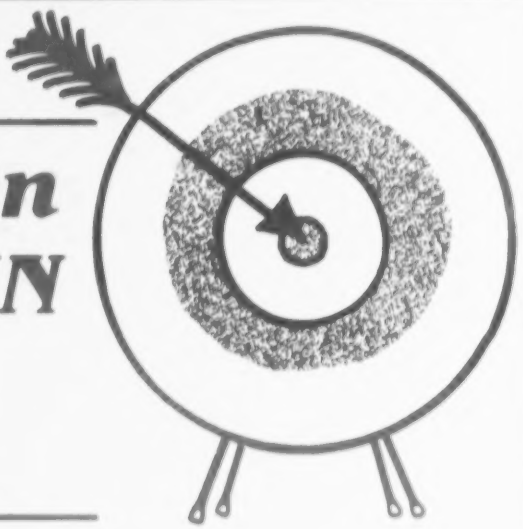
(teacher)

_____

is right on TARGET IN MATH

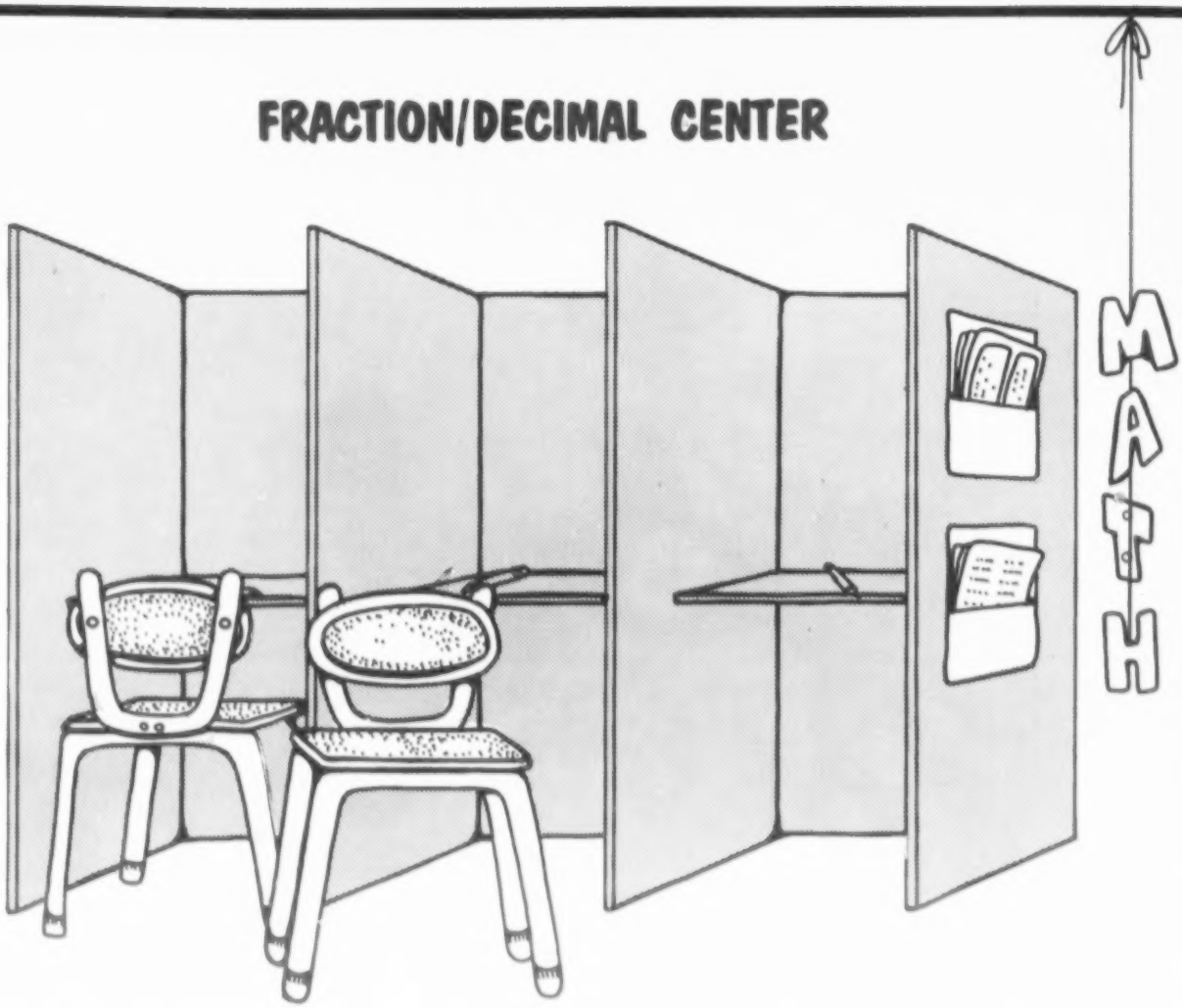
_____

(teacher)



Place these or other similar real life fractions in action on a bulletin board to attract student interest. Ask students to decide which fractions are shown in the various situations by going over the entire board in class. Ask questions like...What part is gone? What fraction has been consumed? What part remains?

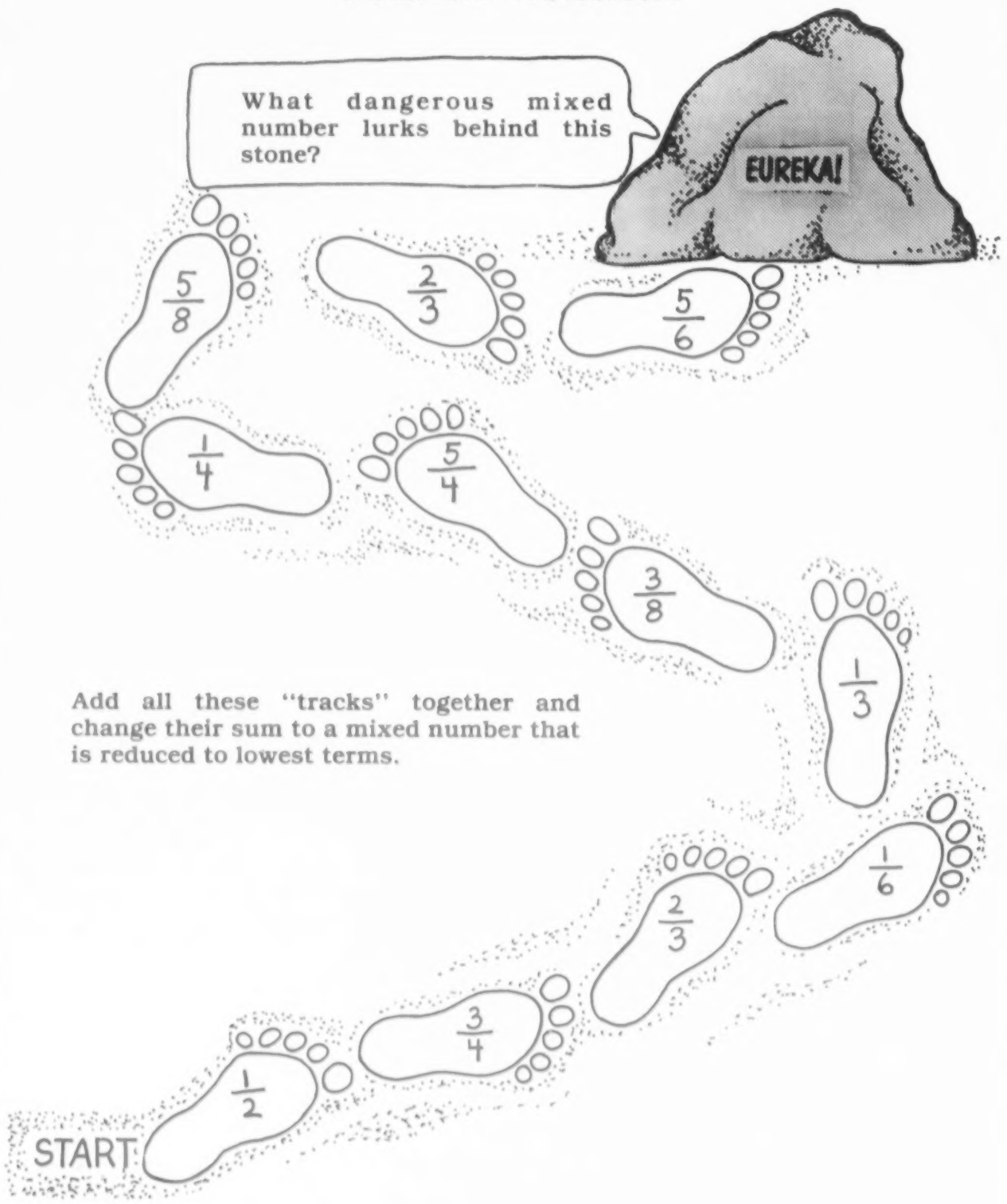
FRACTION/DECIMAL CENTER



Learning centers should provide not only enrichment, but should also serve to stimulate student interest as well. It is important to note that when using centers for enrichment or skill building purposes, there must first be an adequate explanation from the teacher of the techniques involved. Without proper direction, student experiences in the learning center can end in frustration and little accomplishment. One of the more positive spin-offs of the learning center approach is that children learn how to better manage their own time more efficiently. Those students who are successful in this respect often learn a better self-discipline and control over their other study habits.

Study carrels are very effective in creating a learning center and they have the added advantage of providing perhaps the very best chance for placing students in an environment to work which they really feel is their own (if only for the moment). Their major drawback is their cost, but this can oftentimes be cut considerably with a handy carpenter and an abundant supply of plywood.

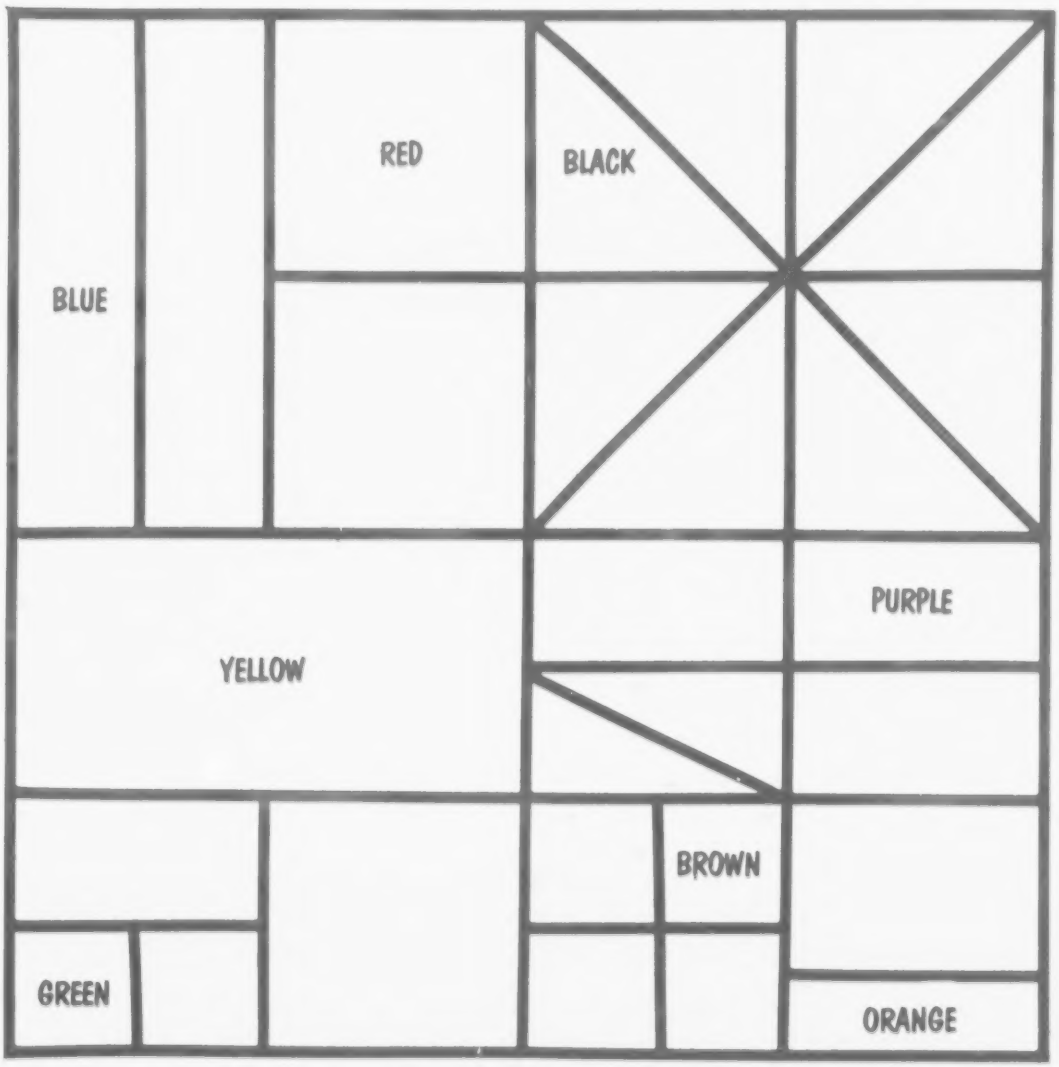
TRACKING FRACTIONS



Add all these "tracks" together and change their sum to a mixed number that is reduced to lowest terms.

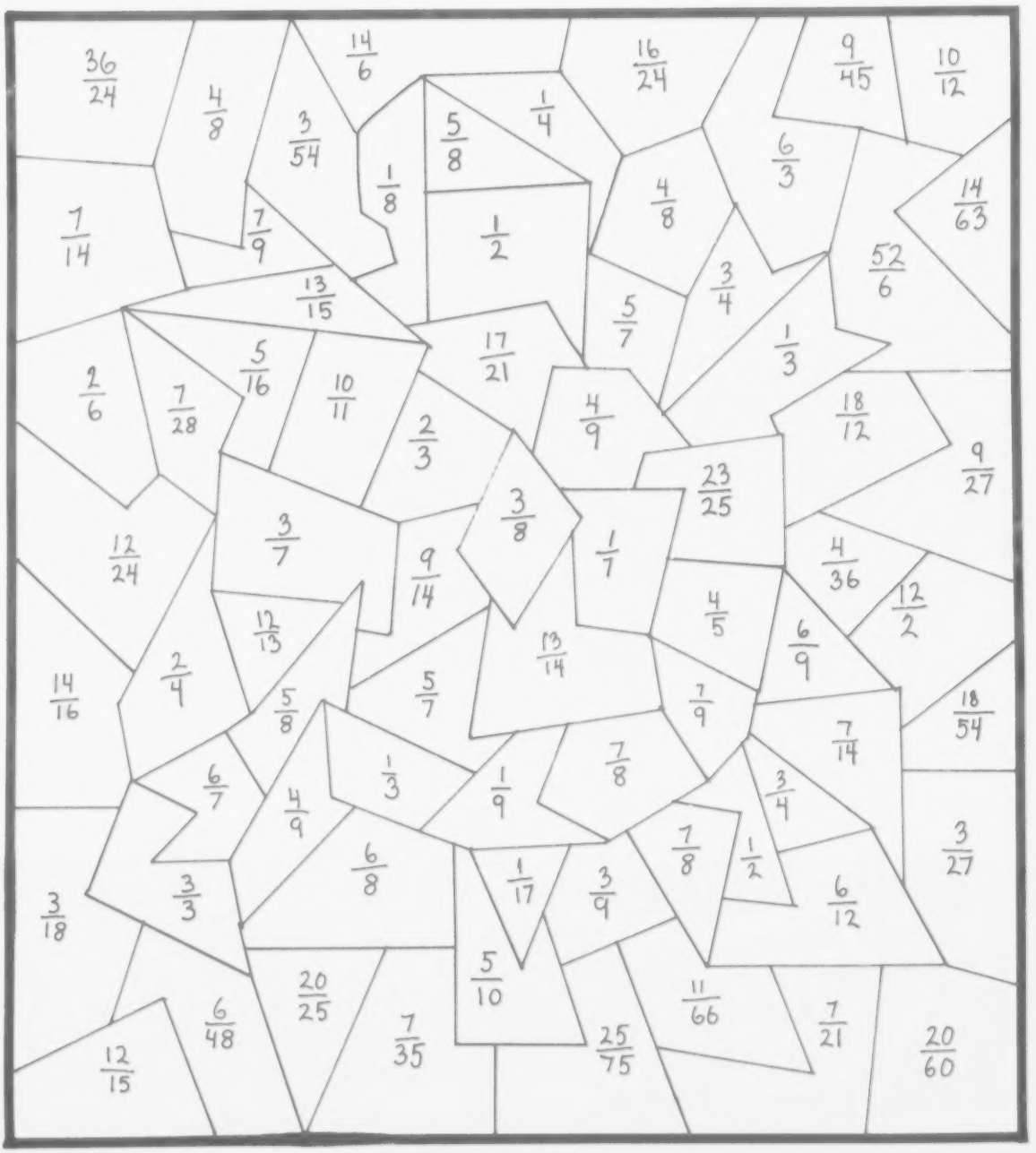
COLORED FRACTIONS

Color each area below indicated with the appropriate marker or crayon. Then look closely at the areas you have colored. What fractional part of the square does the area occupied by each of the colors represent?



HIDDEN ANIMAL

Find the hidden animal in the puzzle below by shading in all areas that contain fractions reduced to lowest terms. Leave unshaded those areas containing fractions that can be further reduced.



FOLDED FRACTIONS

To "fold fractions" you should begin with a number of circles that are all the same size. Use a circular pizza pan for the outline and cut out several circular shapes on plain white paper. You will also need paste and either construction paper or tagboard for pasting down your "folded fractions." Finally, you will need a black felt tipped pen and colored markers if you want to make your fractions more attractive.

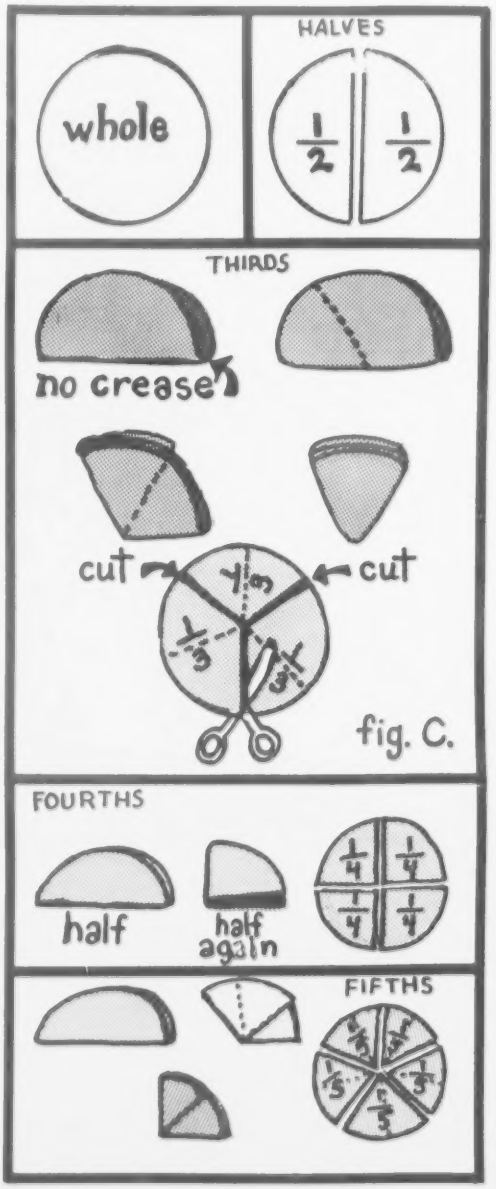
WHOLE: Leave it just like it is.

HALVES: Fold circle in half and cut along fold. Paste on paper and label each half.

THIRDS: Fold circle in half, but do not crease fold. Now fold 1/3 of the top 1/2 on top of the other 2/3. Then fold over other third as in figure C. You now have a circle that is divided into sixths. To make thirds, simply cut along the crease of every other fold. Paste on paper and label each third.

FOURTHS: Fold circle in half first. Then fold in half again to get circle into four equal parts. Cut apart on folds, paste on paper and label each fourth.

FIFTHS: Fold circle in half. Then fold 2/5 of top over 3/5 of top. Next fold remaining 1/5 over already folded 4/5. You now have paper folded into tenths. Cut along every other crease. Paste on paper and label each fifth.



FOLDED FRACTIONS (continued)

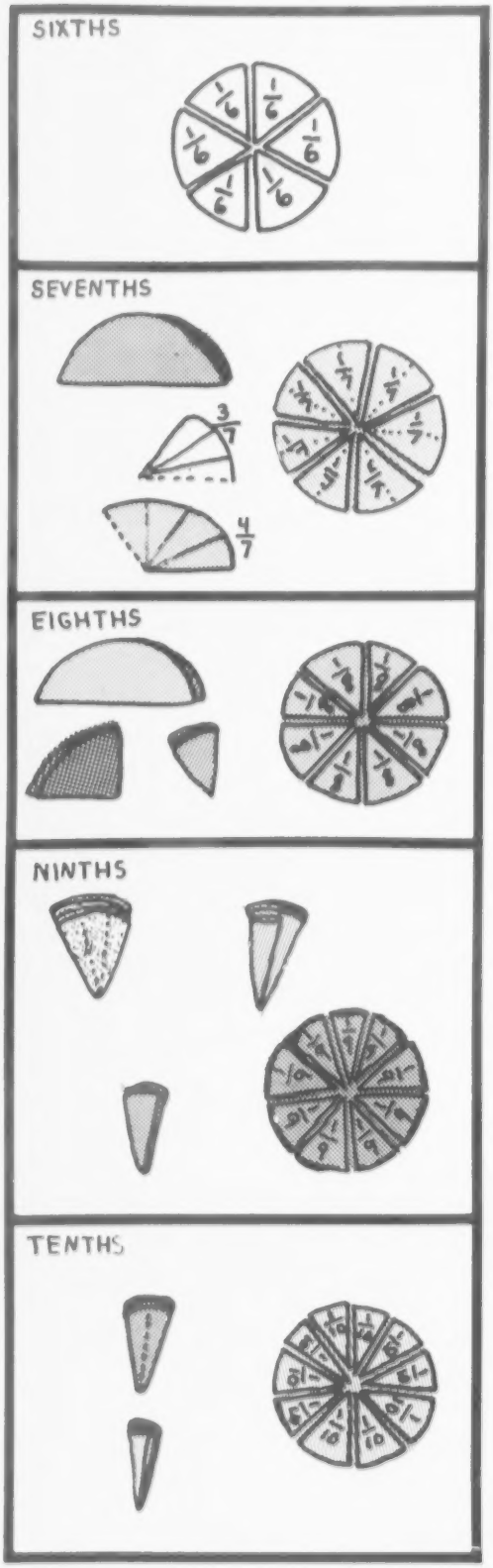
SIXTHS: Use same procedure as for thirds except that you should cut along every fold this time. Paste on paper and label each sixth.

SEVENTHS: Fold circle in half. Then fold 3/4 of top over 4/7. Take remaining 1/7 and fold it over the already-folded 6/7 as shown in figure. Open folds and cut along every other line. Paste on paper and label each seventh.

EIGHTHS: Fold a circle in half. Then fold that half in half again. Finally fold over again. Cut along each crease, paste on paper and label each eighth.

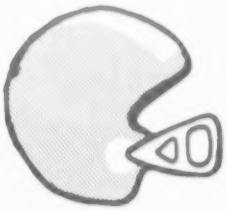
NINTHS: Use same procedure as you used to get thirds (and sixths) except before you unfold thirds, fold 1/3 over 2/3 a final time. Then fold the uncovered third on top of the whole and you will have the circle divided into eighteenths. Cut along every other fold, paste onto paper and label each ninth.

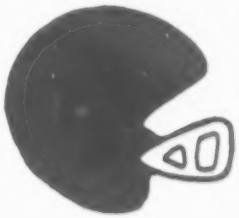
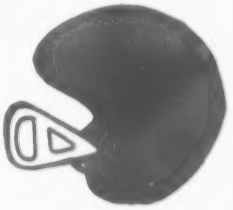
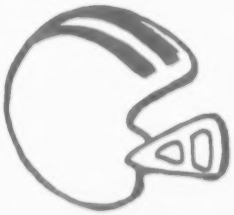
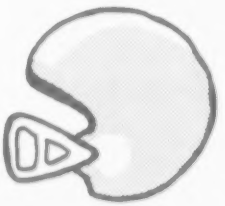
TENTHS: Use the same folds as you used for creating fifths except that you should fold the whole thing in half one more time. Cut along every folded crease, paste onto paper and label each tenth.



SUNDAY AFTERNOON PERCENTAGES

Below are the standings at the end of the eleventh week in the National Football League.



American Conference East			
Buffalo	8	3	0
New England	7	4	0
Baltimore	6	5	0
Miami	6	5	0
N.Y. Jets	2	9	0
Central			
Houston	8	3	0
Cleveland	7	4	0
Pittsburgh	7	4	0
Cincinnati	3	8	0
West			
Oakland	8	3	0
San Diego	7	4	0
Denver	6	5	0
Kansas City	5	6	0
Seattle	4	7	0
National Conference East			
Philadelphia	10	1	0
Dallas	8	3	0
N.Y. Giants	3	8	0
St. Louis	3	8	0
Washington	3	8	0
Central			
Detroit	6	5	0
Minnesota	6	5	0
Green Bay	4	6	1
Tampa Bay	4	6	1
Chicago	4	7	0
West			
Atlanta	8	3	0
Los Angeles	7	4	0
San Francisco	3	8	0
New Orleans	0	11	0

SUNDAY AFTERNOON PERCENTAGES (continued)

Sportswriters publish the won-lost records of professional teams in order to give their readers a better idea of how far one team is either ahead or behind another. In fact many fans have come to identify a team's standings in its league with its won-lost percentage.

Perhaps you could get a better lock on your favorite team if you understood what all those figures mean. Let's take the record of the Buffalo Bills. At this point in the season the Bills have won eight of their eleven games. To calculate their won-lost percentage, simply divide the number of games won (8) by the number of games they *could have won* (11). Thus it becomes a case of 8 ÷ 11.

Note that the percentage is carried to three decimal places and then rounded off.

We could now make all of these statements:

...that Buffalo is winning at 72.7% of its games

...that Buffalo's winning percentage is .727.

...that Buffalo is winning over 7 of each 10 games it plays.

Look at Green Bay's record of 4-6-1. To calculate percentages in tie games, figure it as a half-win and a half-loss. In this case 4 (wins) ÷ 11 games played = .364. Then 5 (wins) ÷ 11 games played = .454. Then add the two percentages together (.364 + .454 = .818) and divide by 2 (.818 ÷ 2); hence Green Bay's percentage is .409.

Your task now is to calculate the rest of the teams' won-lost percentages. Be certain to round off to three decimal places.

After you have finished with your calculations, answer the following questions.

How many percentage points is New England behind Buffalo?

How far are the Jets behind the Baltimore Colts?

How many percentage points is Oakland ahead of Denver?

How big a lead in percentage points does Detroit have over Tampa Bay?

How far is Houston ahead of Pittsburgh?

How far is St. Louis behind the Dallas Cowboys?

SUNDAY AFTERNOON PERCENTAGES (continued)

How far are the L.A. Rams ahead of San Francisco?

In the National Conference which two teams other than divisional leaders have the best won-lost percentage?

Of The Big Apple's (New York City) two professional football franchises, which has the better won-lost percentage record...and by how many percentage points?

Which team in the National Conference has the best won-lost percentage record?

What is the winning percentage of the *worst* team in the NFL?

> There are many factors to be considered when trying to predict the winner in an NFL game. Home field advantage, injuries to key players, the condition of the weather, the urgency to win plus past performance against the opposition are all considered. Not to be forgotten is the team's current won-lost percentage. Using this as the *sole* basis for selecting winners, circle your *prediction* winners in next Sunday's NFL schedule.

Simply put down the percentages of both teams in the blank spaces...then circle the probable winners.

.....Baltimore at New England.....

.....Chicago at Atlanta.....

.....Cincinnati at Cleveland.....

.....Detroit at Tampa Bay.....

.....Houston at New York Jets.....

.....Oakland at Philadelphia.....

.....Pittsburgh at Buffalo.....

.....Green Bay at Minnesota.....

.....Kansas City at St. Louis.....

.....Giants at San Francisco.....

.....Seattle at Denver.....

.....Washington at Dallas.....

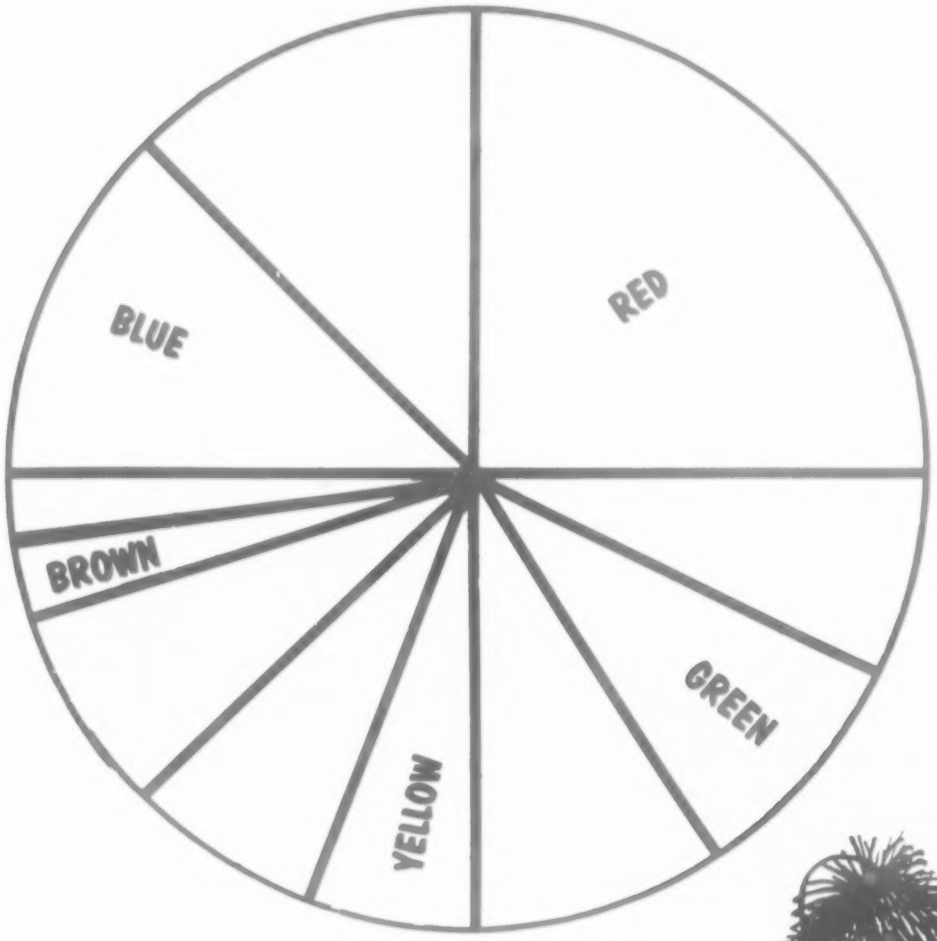
Monday Night Football

.....Los Angeles at New Orleans.....

Calculate the sale price on each of the items in the advertisement. The regular price is listed plus the discounted rate. It's up to you to figure the sale price. How much is the saving in each case?

WHEEL OF FRACTIONS

First, color each indicated area with correct colors (using markers, crayons or water colors). Then add together the parts that you've colored.



What part of the whole do the colored parts represent?

What part is left uncolored?

Choose any colors you like to finish the wheel. Check yourself. Add the fractions of all the colored parts. Do they total 1?

The greatest selling record in history...selling over 100,000,000 copies since it was written in 1941.

Fraction Equivalents

16 90 45 36 24

9 64 10 30 6 4 5 36 21

1st Word 6/9=E/36 8/11=W/22 4/9=T/81 9/10=H/100 5/6=I/54

2nd Word 1/2=S/12 1/5=M/25 2/15=T/30 3/15=C/45 7/8=S/24

5/8=I/48 8/9=H/72 4/7=D/63 2/7=R/35

He has won more gold records (for selling one million copies) then anyone else...116

Decimal Equivalents

.5 .25 .6 .125 .20

.10 .333 .75 .40 .80 .1667 .67

First Name

1/4=L 1/8=I 3/5=V 1/5=S 1/2=E

Last Name

2/3=Y 1/10=P 4/5=L 3/4=E 1/3=R 1/6=E 3/5=S

The all-time best seller among long-playing albums

Fraction Equivalents

36 15 3 9 55 24 28

36 5 6 8 18

1st Word 3/10=O/50 3/7=N/21 4/9=S/81 11/12=D/60 1/4=U/12

2nd Word 7/15=F/60 6/25=O/100

3rd Word 3/13=S/26 3/6=C/24 6/7=M/42 1/5=U/25 2/3=I/12

The most successful recording artist of all time with sales of over 300,650,000 records

Decimal Equivalents

.32 .04 .44 .28

.22 1.75 .75 .65 .15 1.4

1st Name 11/25=N 1/25=I 7/25=G 9/25=B

2nd Name 7/5=Y 11/50=C 6/8=O 7/4=R 3/20=B 13/20=S

A TIP OF THE HAT TO YOU _____

for completing your contract

_____

(teacher)

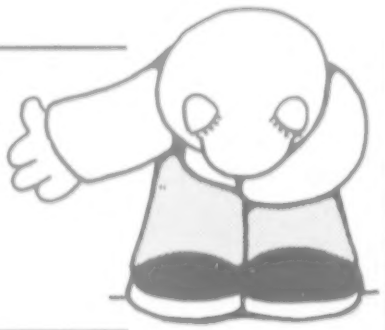
TAKE A BOW

_____

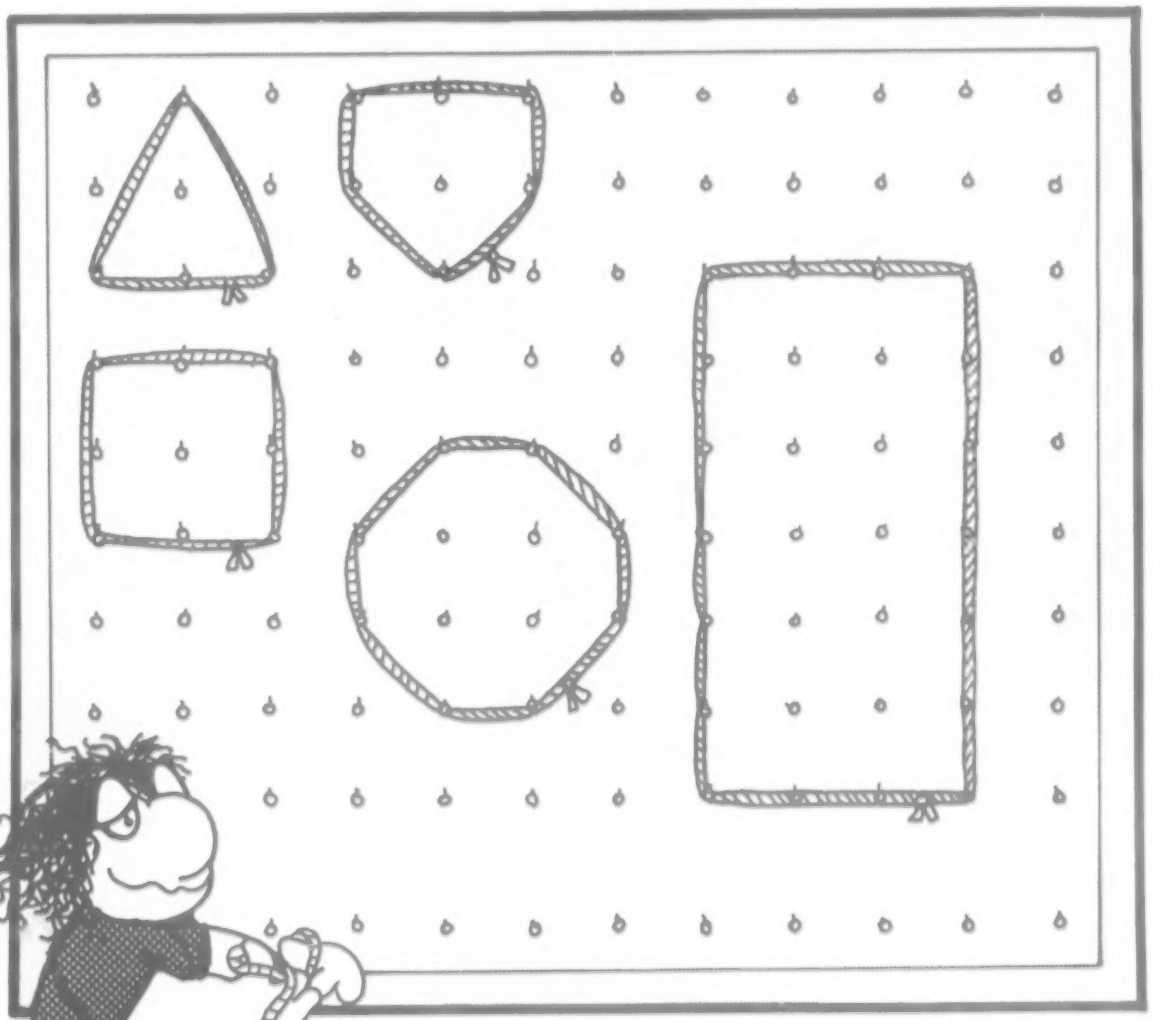
for your good work in math

_____

(teacher)

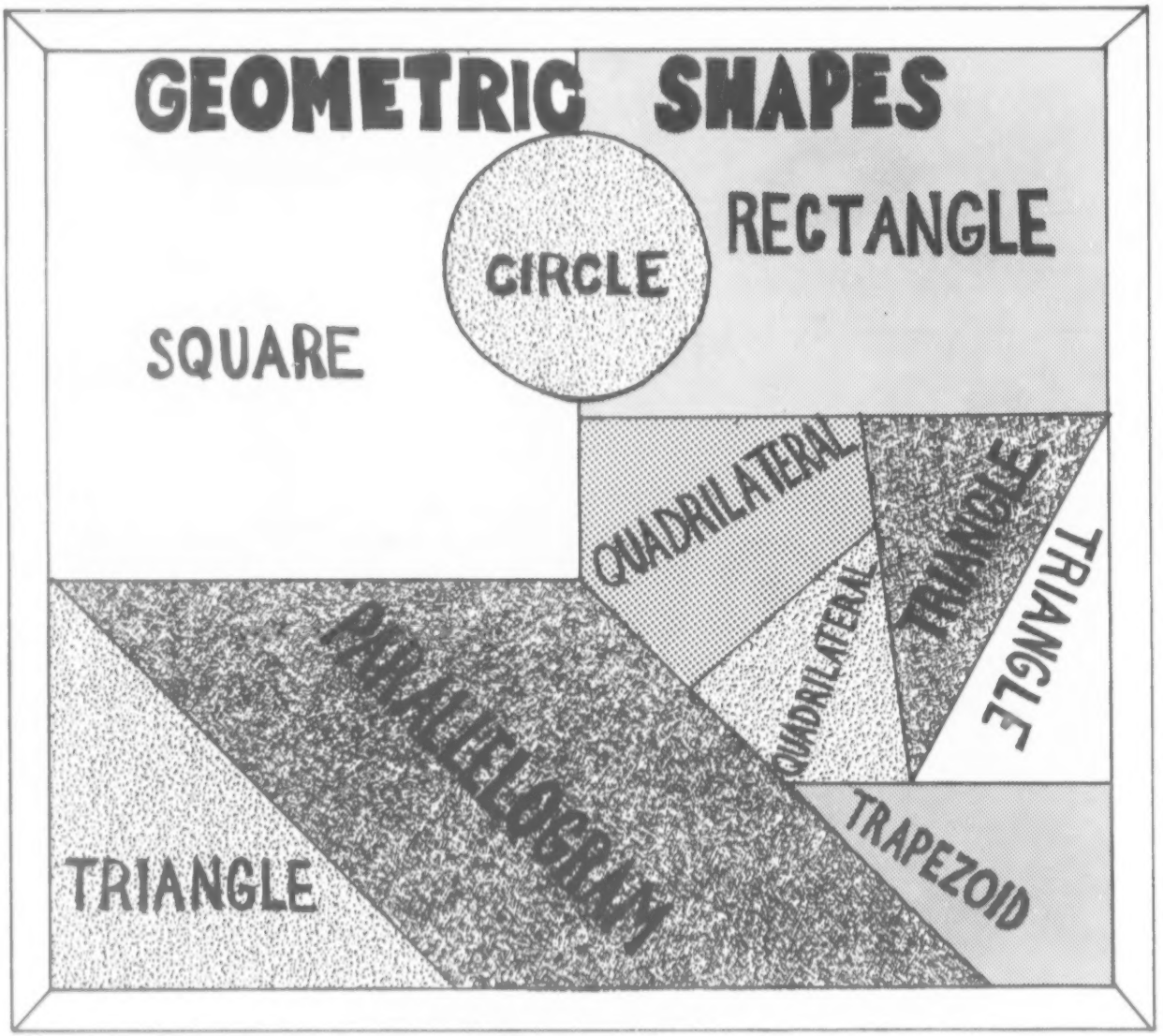


GEOBOARD GEOMETRY



Cover board area with yellow poster board. Cut letters from green construction paper. Mark off a large square within the board area and cover it with light blue poster board. Arrange thumbtacks at intervals throughout the board area. Use strips of colored yarn to show examples of various geometric shapes.

After children have become familiar with geometric shapes and how to make them, have them design some shapes of their own using same technique. Students can then create names for their "original" shapes.

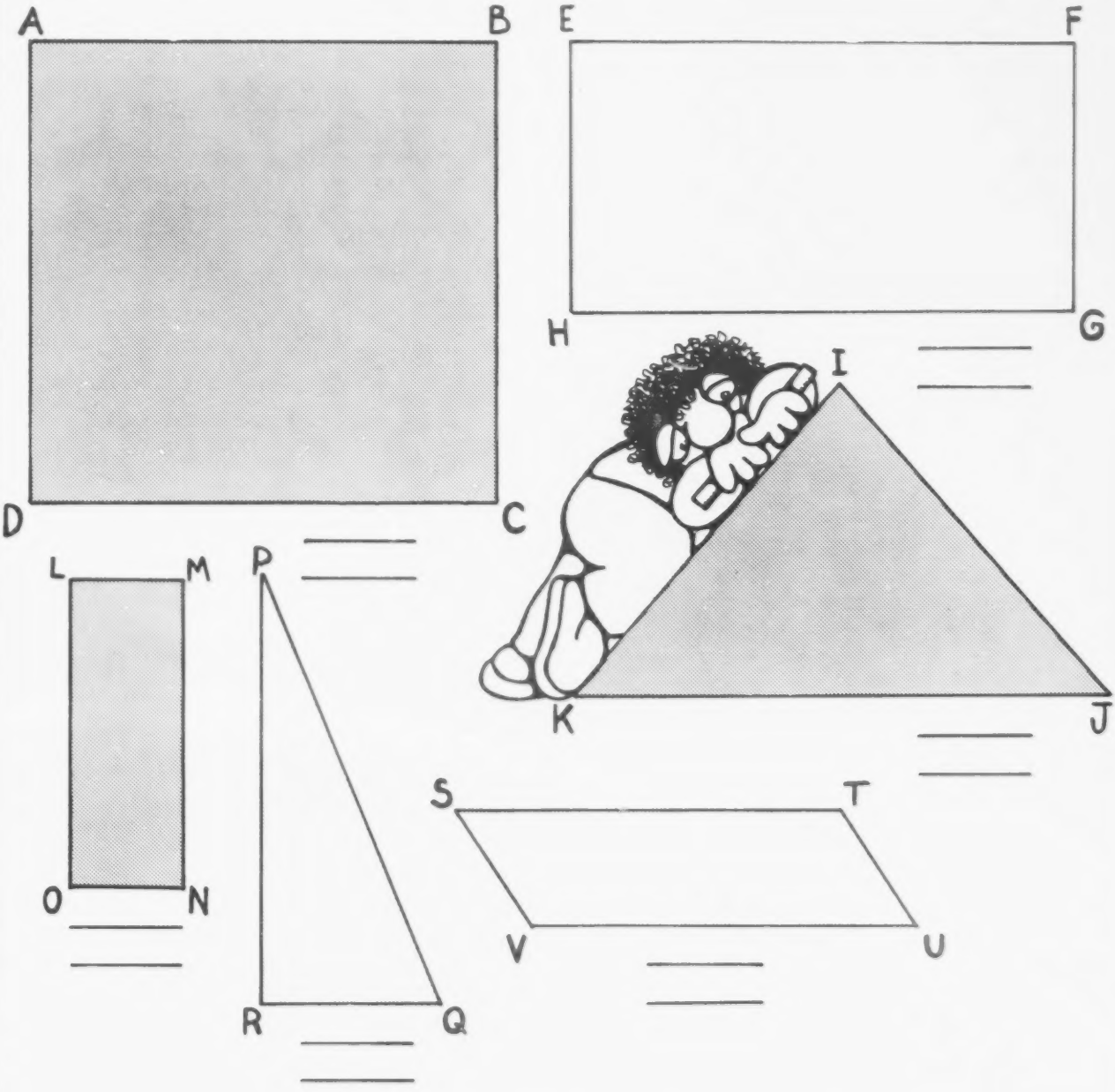


Another good bulletin board for attracting student interest in a study of shapes is this "wall-to-wall" collage of shapes. Using colored construction paper or colored poster board, cut out enough geometric shapes to entirely cover board area. It doesn't matter if some overlap others since they will be of different and contrasting colors. Once you've arranged the shapes the way you want them on the board, use the flat side of a black felt tipped marker to label each shape.

Stock your center with an ample supply of scratch paper (or construction paper or poster board if you have plenty) and let your students duplicate some of the shapes on the board. Make certain the center also has several felt tipped markers (for labeling) and a few pairs of scissors.

THE LONG WAY AROUND

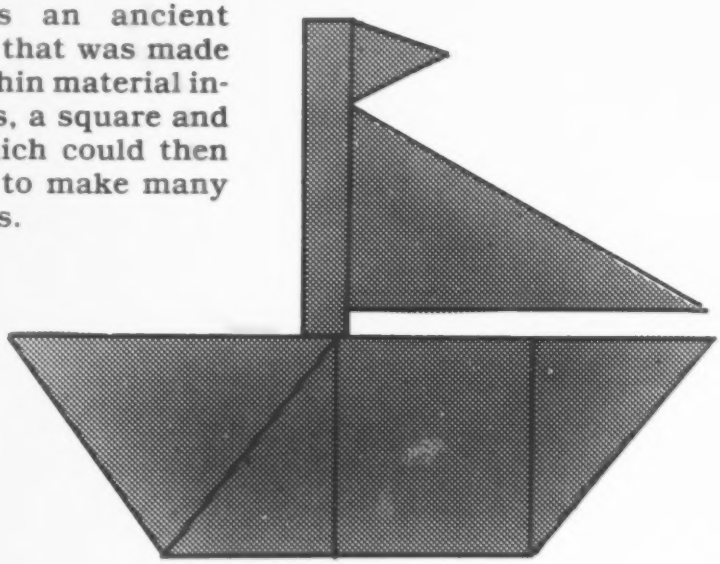
Measure the perimeter of each of these shapes in centimeters and place your answer on the top blank space below each figure. Then measure the same distance in inches and place that answer in the second blank below each figure. When you are finished, compare your own answers with those of other members of your class.

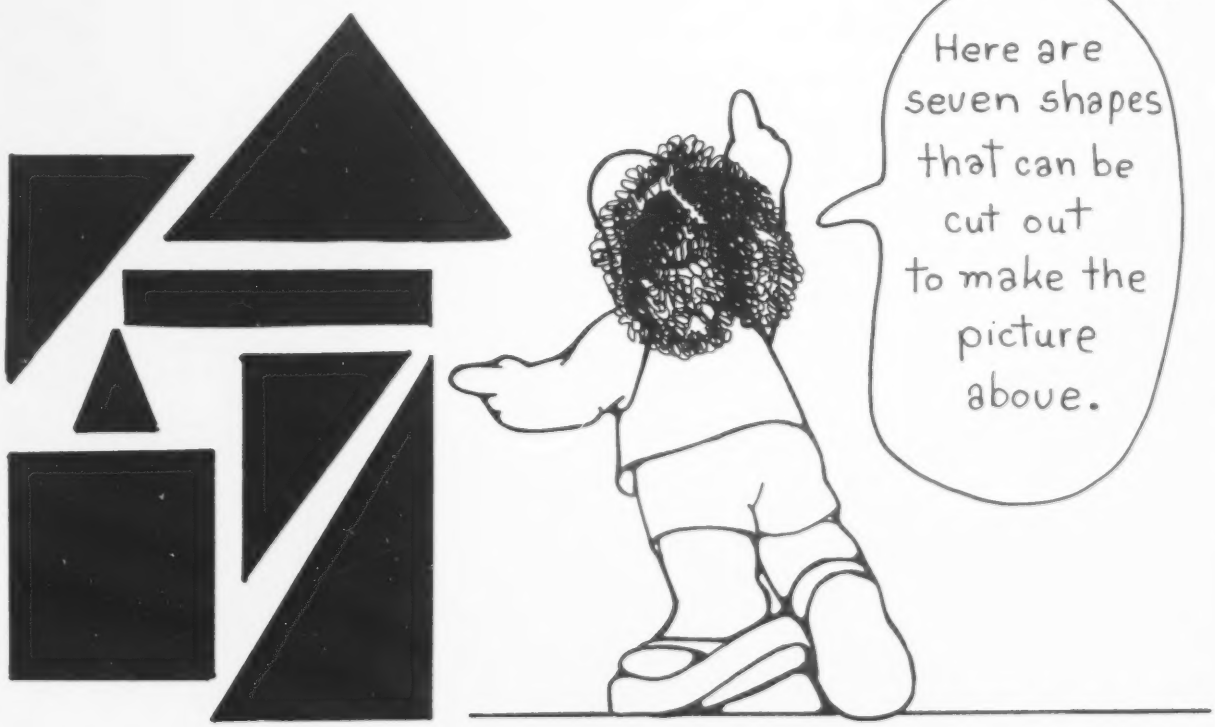


97

Shapes . . . Tangrams . . .

A *tangram* is an ancient Chinese puzzle that was made by a square of thin material into five triangles, a square and a rhomboid which could then be recombined to make many different figures.

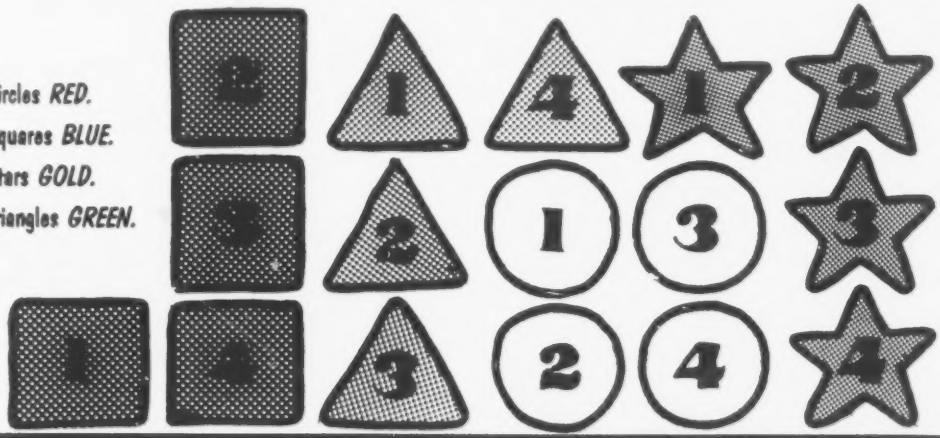


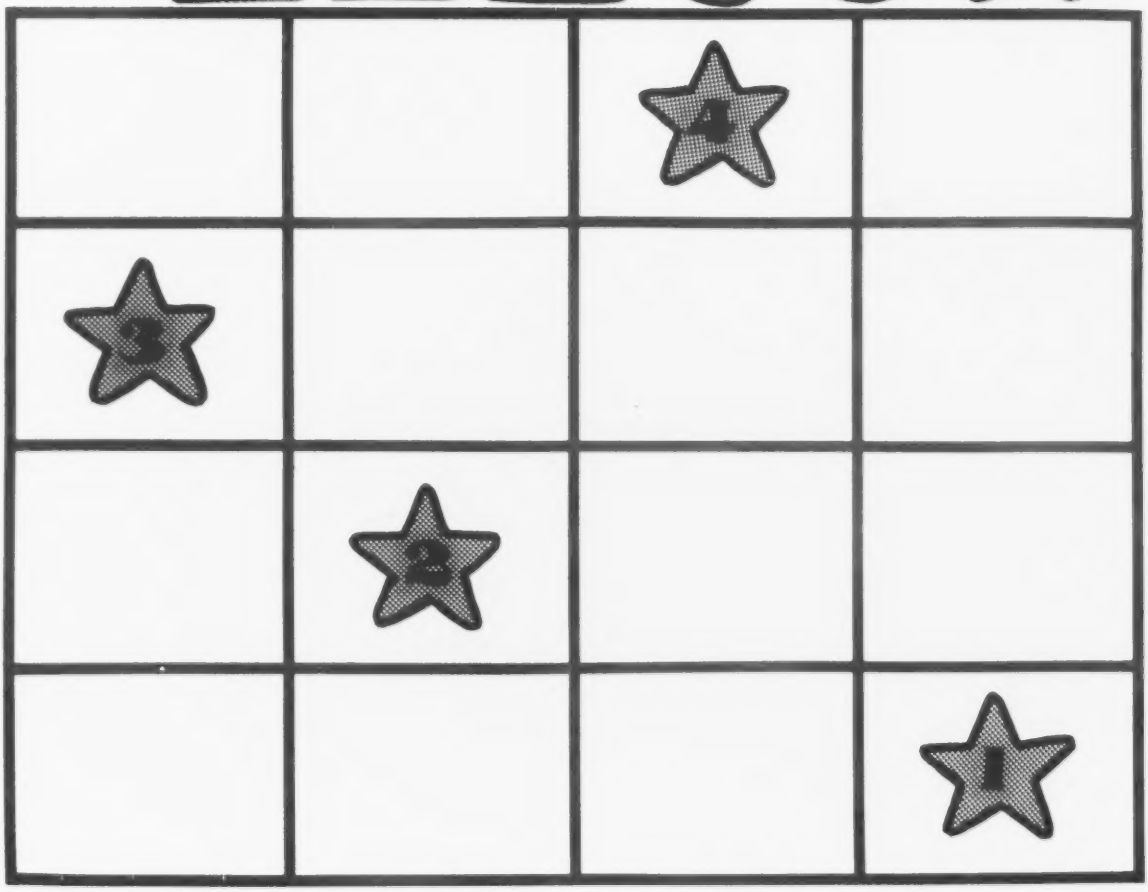


COLORED SHAPES

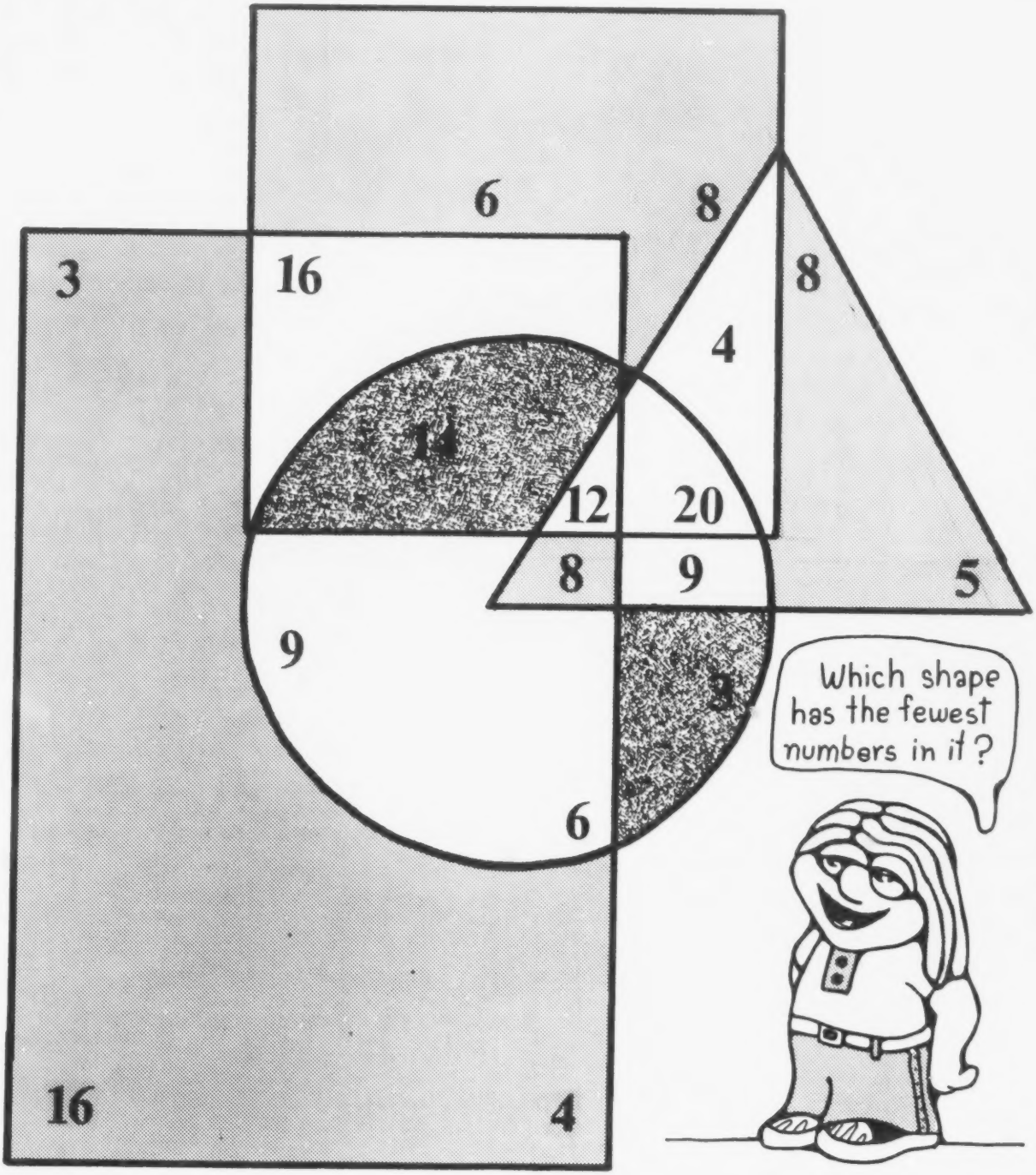
Color the shapes below as instructed. Then cut them out and place them on the large square below. No similar shapes (colors) nor numbers may appear in the same row, the same column or the same diagonal. Put the stars on the square as shown.

Color the circles *RED.*
Color the squares *BLUE.*
Color the stars *GOLD.*
Color the triangles *GREEN.*





SEARCHING SHAPES



SEARCHING SHAPES (continued)

Which numbers are in the square, but not in the circle? _____

Which numbers are in the circle, but not in the square? _____

Which numbers are within the circle, but are also part of the rectangle and the square? _____

_____

Which numbers are in the square, but not in the rectangle? _____

Which numbers are outside the circle, but are still inside the square? ____

Which numbers are in the rectangle and the triangle, but are not in the circle or in the square? _____

Which numbers are in the triangle, but are not in the square? _____

Which number(s) are in both the square and the circle? _____

Which number(s) are in the circle, the square, and the rectangle, but are not in the triangle? _____

_____

What is the sum of the numbers in the circle? _____

What is the sum of the numbers in the triangle? _____

What is the sum of all the numbers lying within the square? _____

What is the sum of all the numbers within the rectangle? _____

What is the sum of the numbers lying within the circle, but not in the triangle? _____

_____

Which numbers are in the circle but are not in either the rectangle or the triangle? _____

_____

What number(s) are found in all four of the shapes? _____

What is the total of all the numbers in all the shapes? _____

Which of the shapes has the highest total of numbers? _____

Which shape has the most numbers found within it? _____

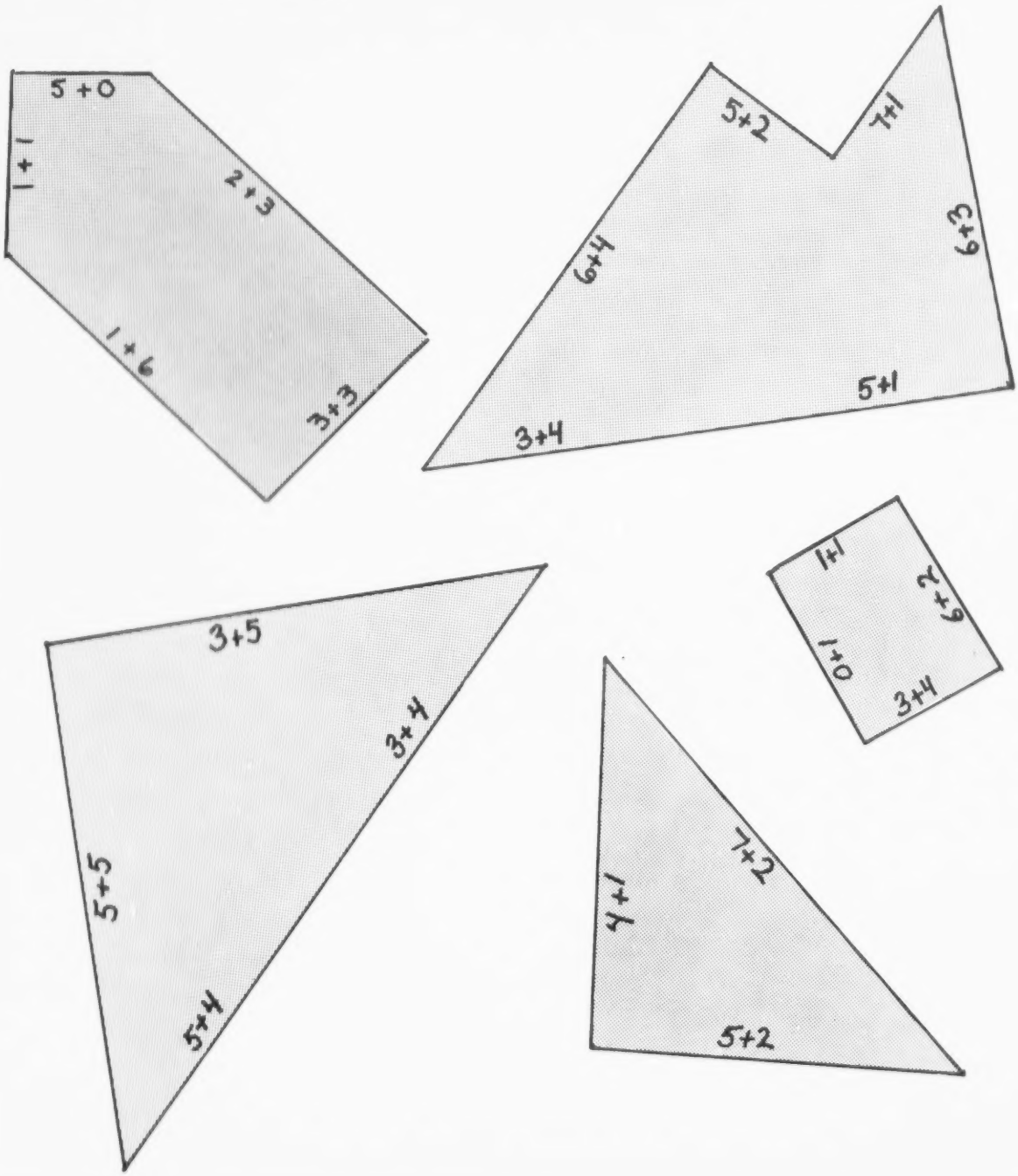
Which shape has the fewest numbers in it? _____

Which shape has the smallest total of numbers contained within? _____

_____

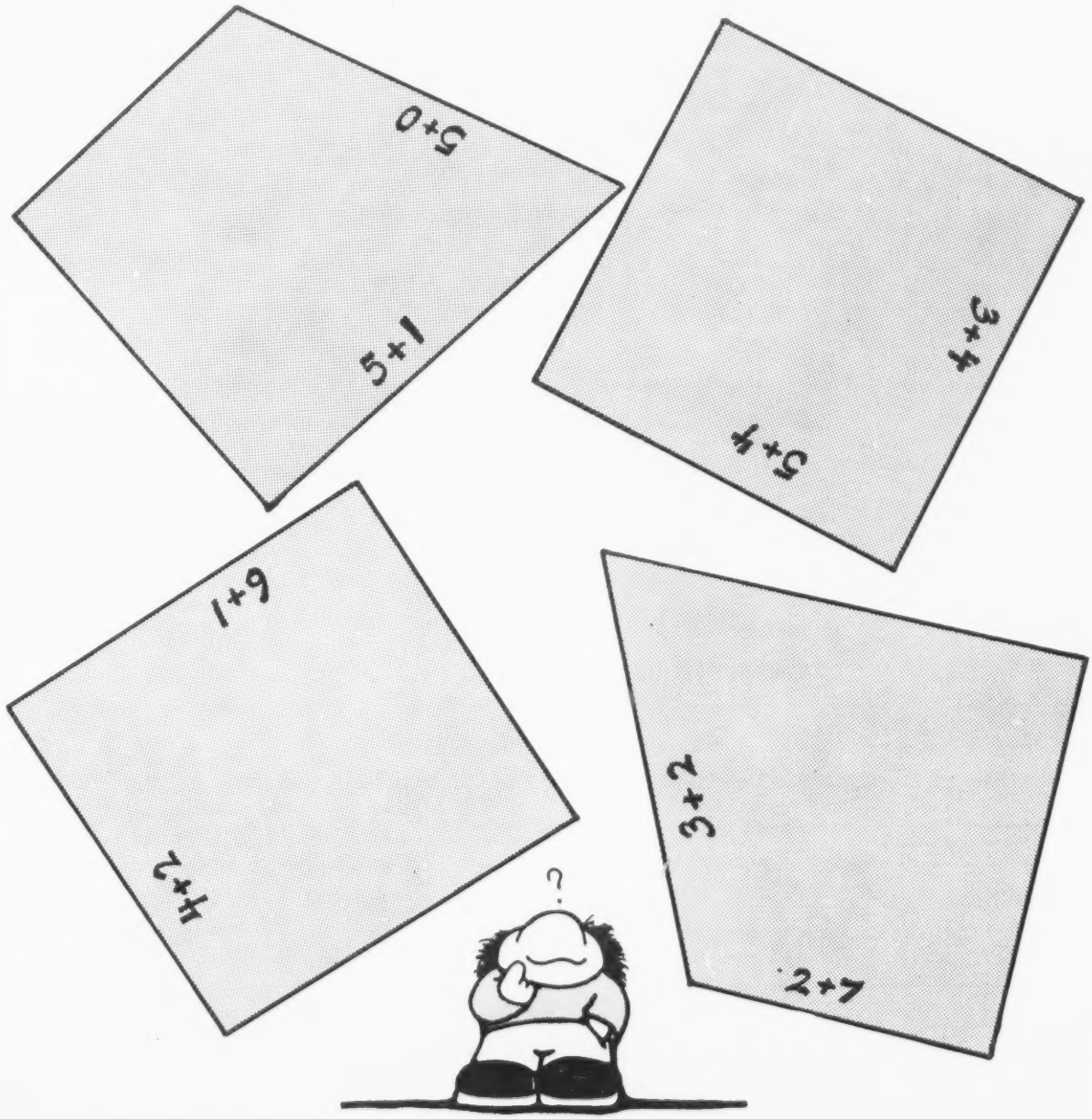
MATCHING SIDE TO SIDE...

Match the sides of the pieces of the puzzle below so that all of the problems in addition having the same answers lie adjacent to each other. When you finish, you should have a square. If not, then you've done something wrong.



SHAPING UP

Make a very distinctive geometric shape from the following puzzle pieces by placing the sides which have the same totals next to each other. What kind of a shape do you end up with?



RUBBER BAND GEOMETRY

Geoboard Geometry can be a lot of fun, but you really need to become familiar with a number of shapes before you try.

Geoboards are made of acoustical ceiling tile. Be sure you get one that will hold thumbtacks. Use large thumbtacks with big heads. You'll also need several large rubber bands.

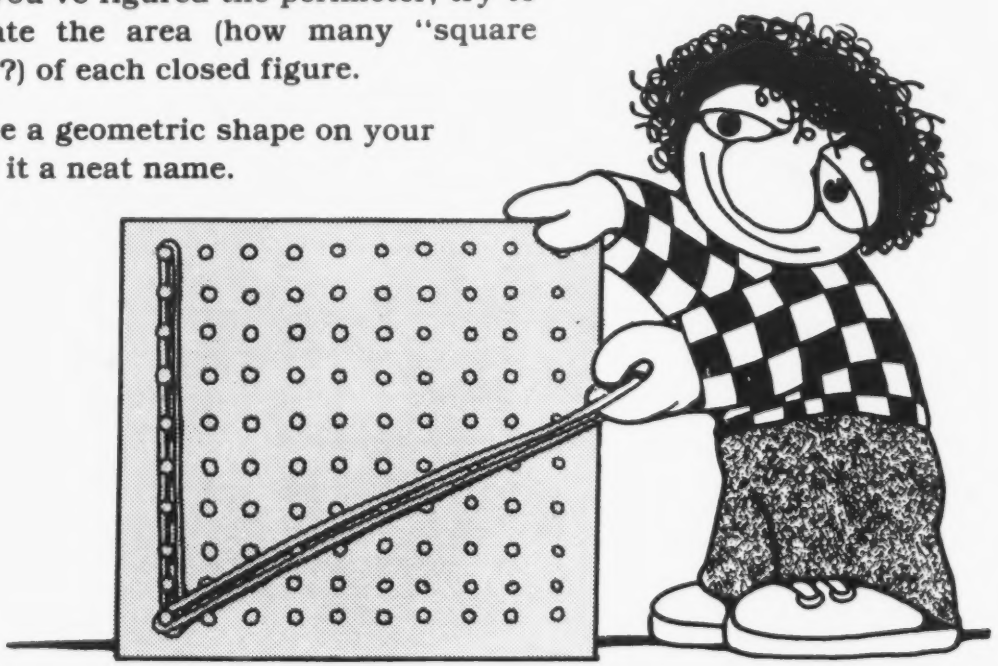
Then do the following:

1. Show an acute angle
2. Show an equilateral triangle
3. Make a square
4. Show a right angle
5. Make two lines that are parallel to one another
6. Make two lines that are perpendicular
7. Make a hexagon...then an octagon
8. Show a trapezoid
9. Make a rectangle
10. Create an obtuse angle

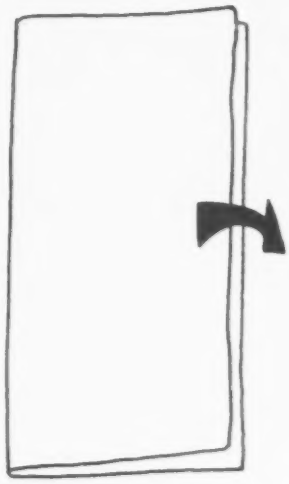
Count tacks to get the perimeter of each of the above.

After you've figured the perimeter, try to calculate the area (how many "square tacks"?) of each closed figure.

Finally, create a geometric shape on your own and give it a neat name.



TAKING THE ROUND OUT OF SQUARE



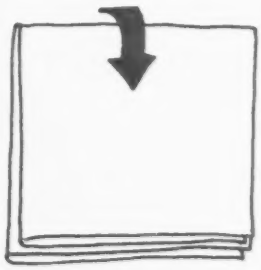
Begin by folding a square sheet of paper in half.

Then fold the paper in half again to get a folded square as shown in figure A.

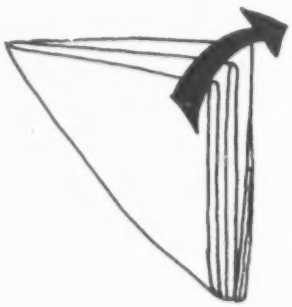
Then fold diagonally to look like figure B.

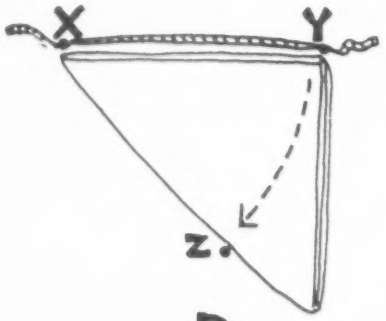
Next, use a piece of string to measure off the distance between X and Y as in figure B. Keep the end of the string on X and move the other end from Y toward Z, marking the distance along the way.

Finally, cut along arc YZ and you should have a circle. Wasn't that great fun?

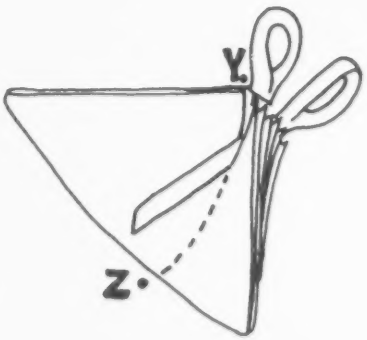


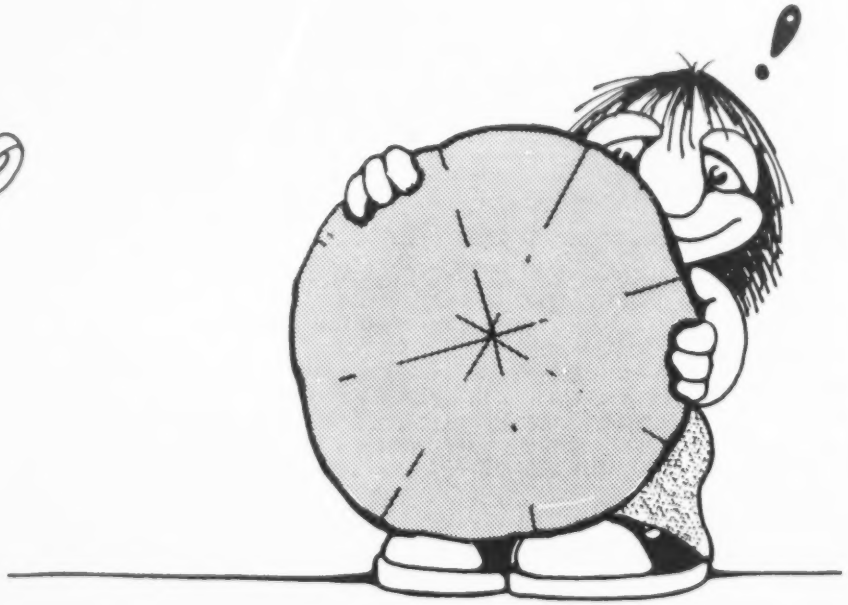
A





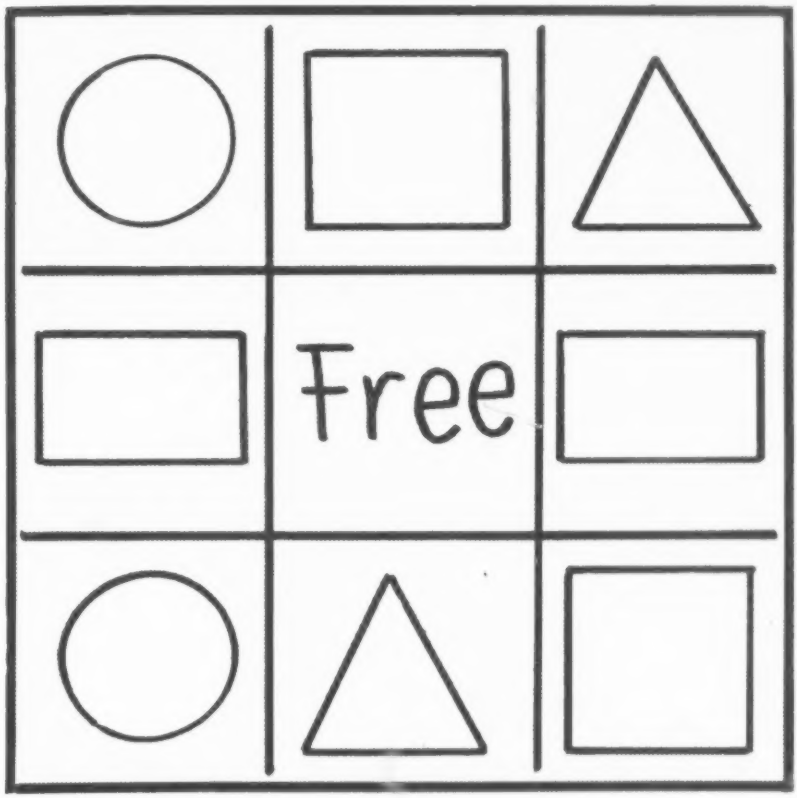
B

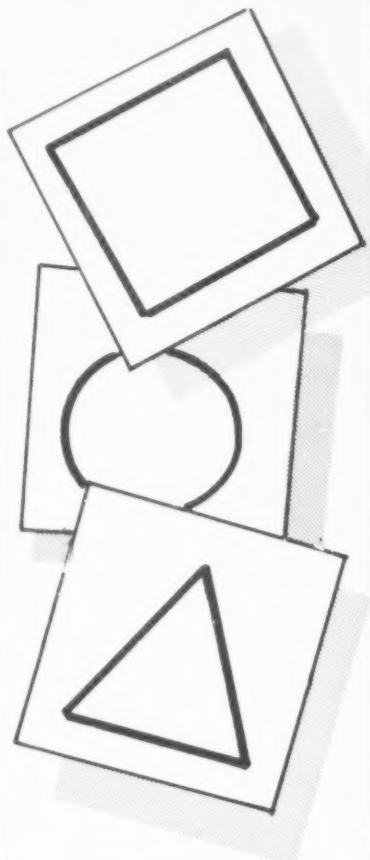




TIC-TAC-SHAPE

Create enough boards similar to the board below for your entire class by cutting out several nine-inch squares from tagboard. Divide each board into nine one-inch squares with a ruler and felt tipped pen. Then draw a single shape in each of the squares. Mix up the drawings on the boards so that you have a wide variety of different cards.

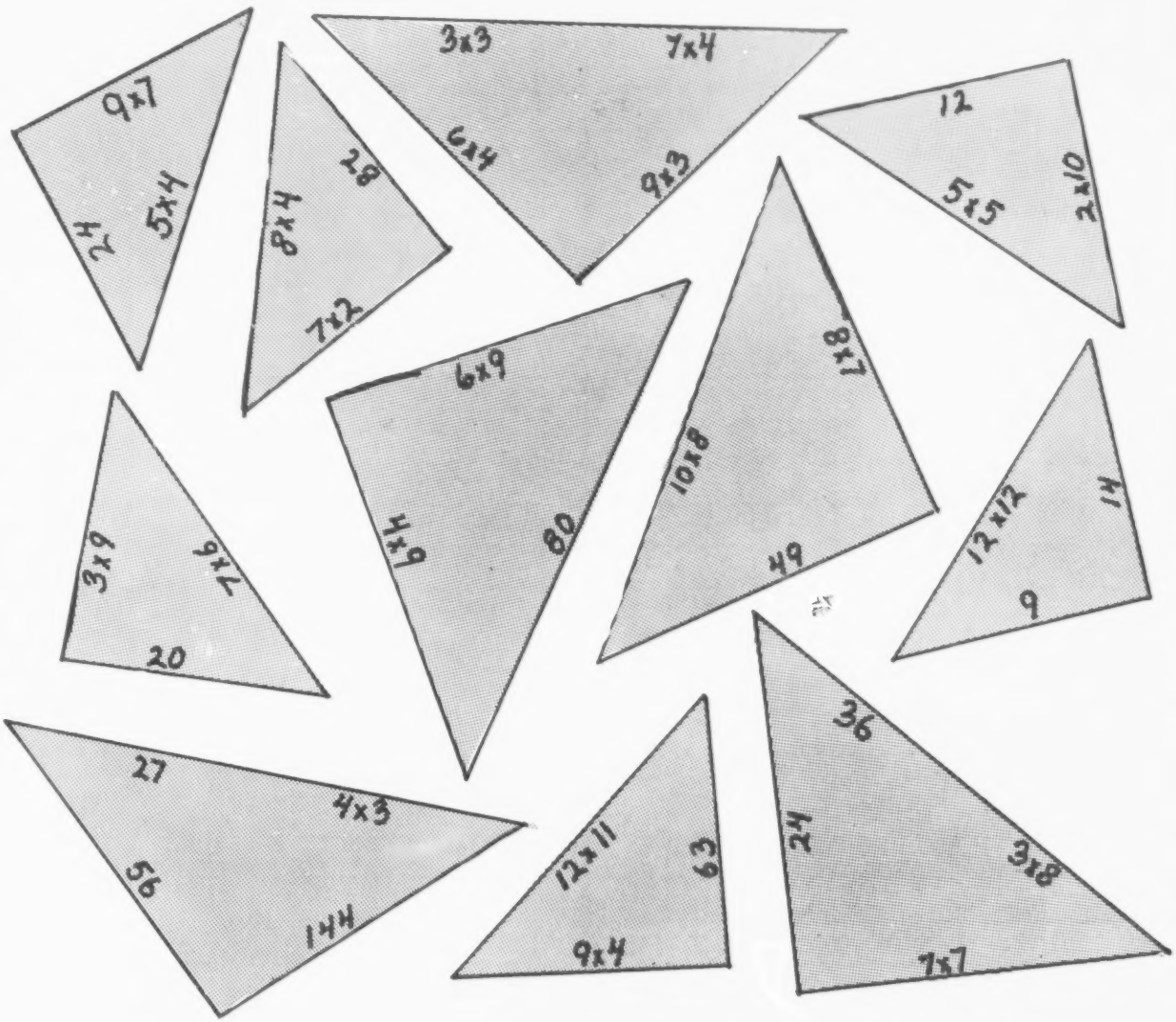




You then need to cut out several (at least 50) one-inch squares from tagboard. Draw a single shape on each one and cover with Con-Tact paper. Each player is then given several playing tokens (coins, grains of corn, etc.). The cards are shuffled and play begins with the caller drawing a single card and showing it to all players as in Bingo. Each player having that shape on his card places a token on that shape. Play continues until one player has covered three squares either vertically, horizontally or diagonally. The winner then becomes the caller for the next game.

IF THE SIDE FITS.....

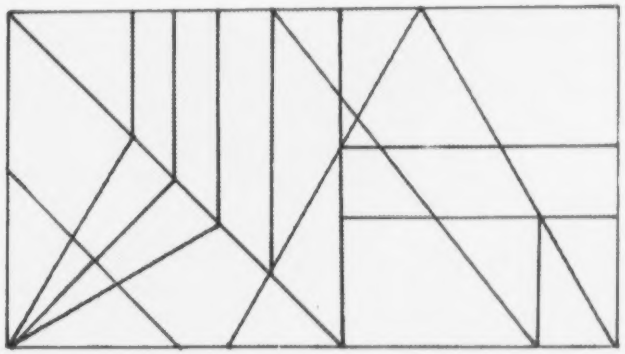
Cut out all of the triangles below. Then fit the side of each triangle next to the side of another triangle whose side has the correct answer to the multiplication problem.



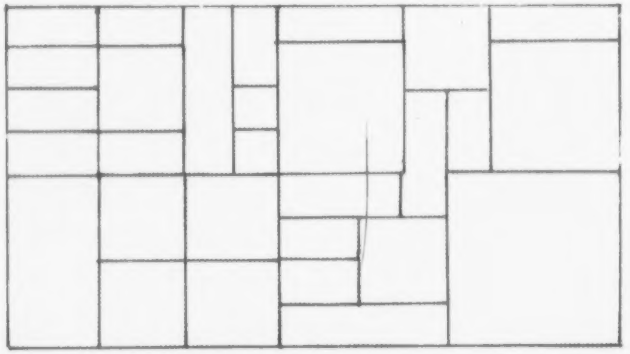
When you've finished, your triangle ought to make a square. It will if you put all the pieces in the right places.

A Number of Shapes Independent Study Cards

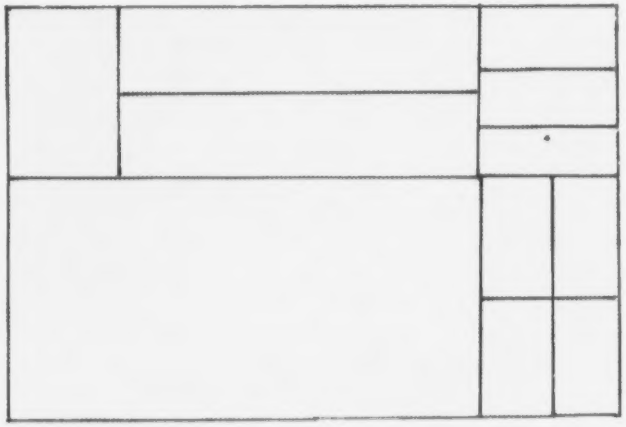
How many triangles can you find in the shape below?



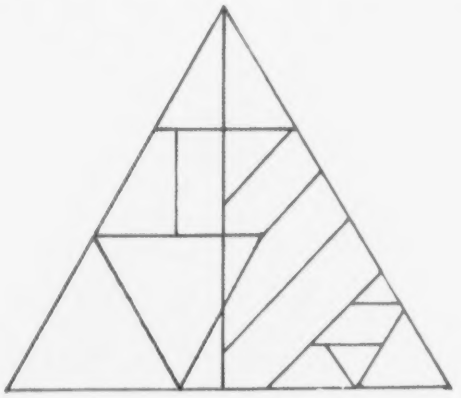
How many squares can you find in the drawing below?



How many rectangles can you find in the drawing below?



How many triangles can you find in the triangle below?

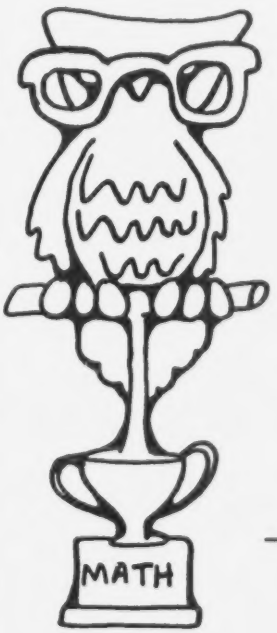


BRAVO for you!

_____. I know now I can always count on you to do what you say you'll do.

_____

(teacher)

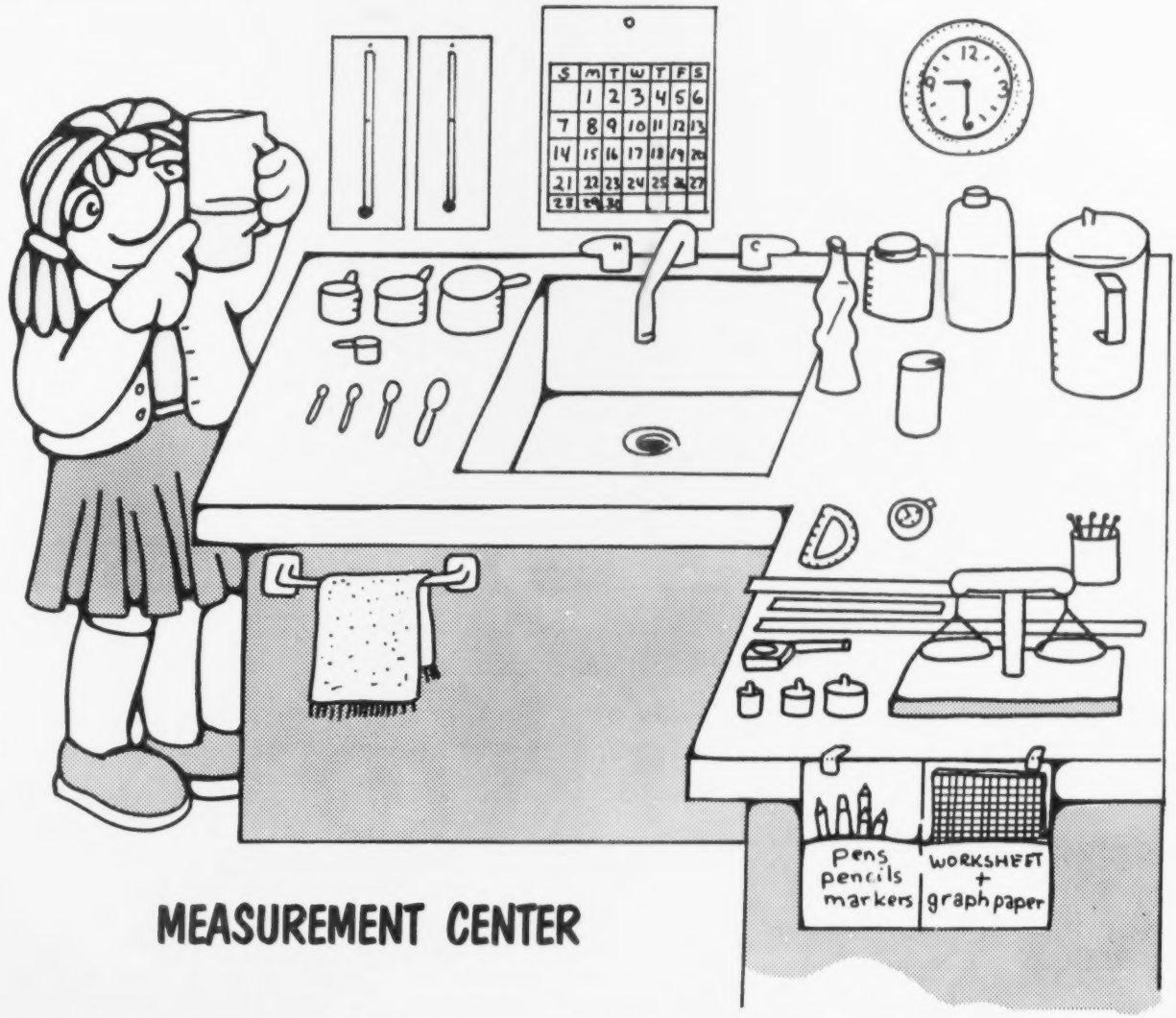


_____

wins the OLLIE OWL AWARD for wise work in math.

_____

(teacher)



MEASUREMENT CENTER

It is convenient if you can place this center near a sink. Students will than have a better chance to compare various liquid measures. If this is impossible, obtain a large quantity of beans, unpopped popcorn, or other small pelleted objects that can be used to compare the containers or vessels which hold various amounts of liquid measure.

Things to put in your measurement center include:

meter sticks
yard sticks
tape measures
rulers
measuring cups
measuring spoons
liter containers
quart containers
pint containers
weights
scales
clocks
thermometers
gallon containers
graph paper
pencils
felt tipped markers
calipers
protractors

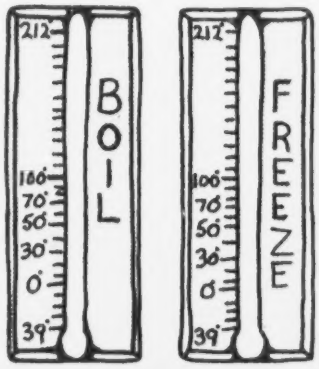
MEASURES OF PURCHASE

In what quantity do we buy each of the following?

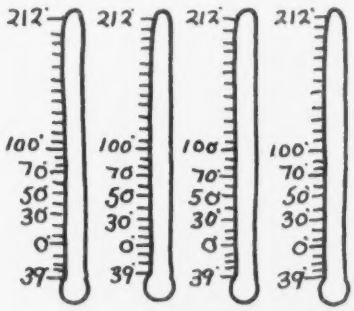
milk _____
bacon _____
gasoline _____
butter _____
rolls _____
eggs _____
breakfast food _____
hamburger _____
orange juice _____
beans _____
soap _____
soda pop _____
soup _____
chilli _____
steak _____
hot dogs _____
tissue _____
buns _____
candy _____
gum _____

gallon
pound
dozen
box
ounce
bar
carton
can
roll
loaf
sack
quart
cake

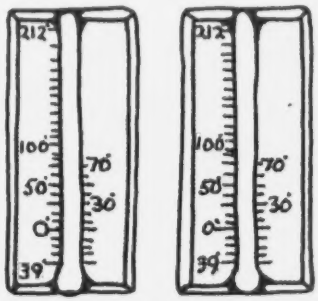
THERMOMETRY



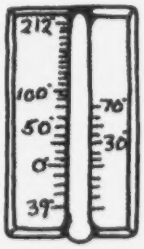
Water freezes at 32° Fahrenheit and boils at 212° Fahrenheit. Show both of these extremes in the thermometers to the right.



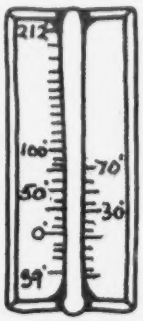
Show the following temperatures in the thermometers to the left by shading in the correct levels: 40° 72° 93° 16°



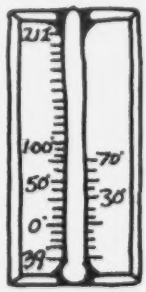
Show a thermometer that registers 12° below freezing, then one that registers 12° above freezing.



Show a thermometer that is exactly 19° below the boiling point of water.



Find out about the *normal body temperature* and show that temperature on the thermometer to the left. How does a person feel when his or her body temperature rises above this mark?

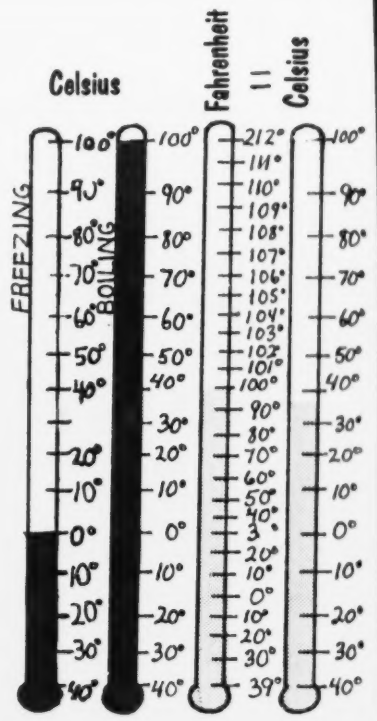


Show a temperature you think would be correct for a "very hot summer day."

Shade in the way you like the "mercury" to register when you are *most* comfortable.

THERMOMETRY (continued)

The Celsius thermometer shows 0° to be the freezing point and 100° to be the boiling point of water. Show both of these readings on the thermometers to the right.



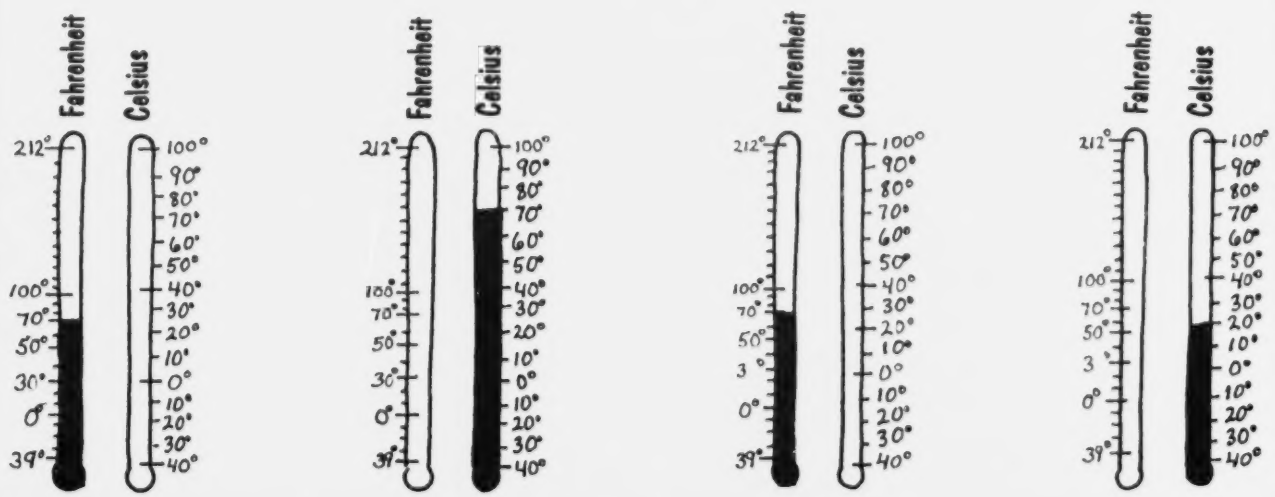
These days many of those bank thermometers which alternate between flashing the time and the temperature are also including a Celsius reading. Look at the comparisons to the right.

In each case both the Fahrenheit reading and the Celsius thermometer are saying the same thing. They're just saying it in different ways.

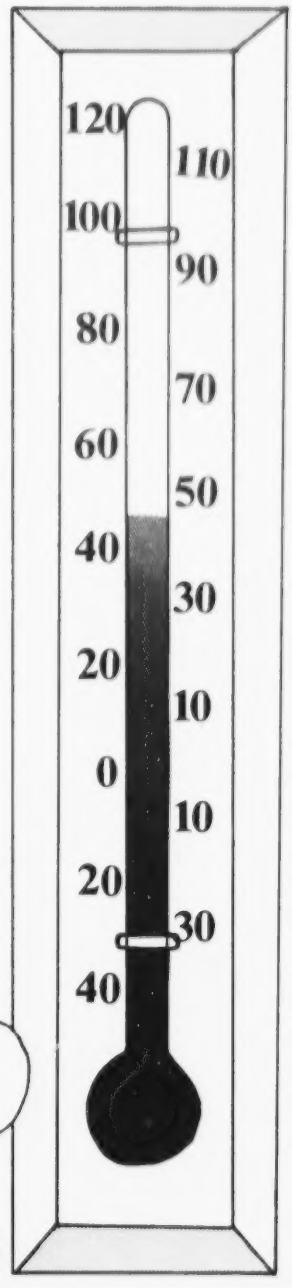
To change a Fahrenheit reading to a Celsius reading, you need to subtract 32° from the Fahrenheit scale first and then multiply the result by 5/9. Try one of the above just to see if it works.

On the other hand, if you want to change a Celsius reading to the Fahrenheit scale, you need to multiply the Celsius reading by 9/5 first; then add 32 to the product. Try one of the other comparisons above to see if you are doing the work correctly.

Below are some themometers which show either Fahrenheit readings or Celsius readings. In the blank thermometer write in the correct reading that is missing after you have made your calculations and shaded in the area.



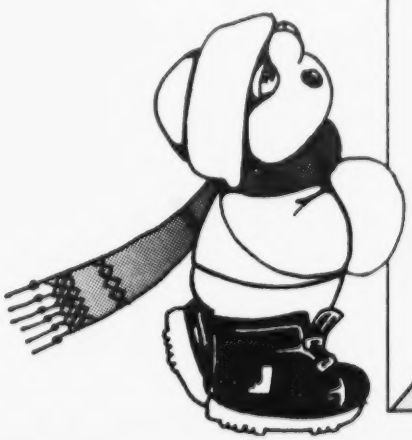
AN "AVERAGE" DAY



The high temperature for November 3 was 72° Fahrenheit, while the low for that day was 46° Fahrenheit. What was the difference in degrees between the high and the low on that particular day?

The record high for the day (November 3) was 81° set back in 1946. The record low for a November 3 was 24° Fahrenheit recorded in 1928. What is the difference in degrees between the record high and record low temperatures for November 3?

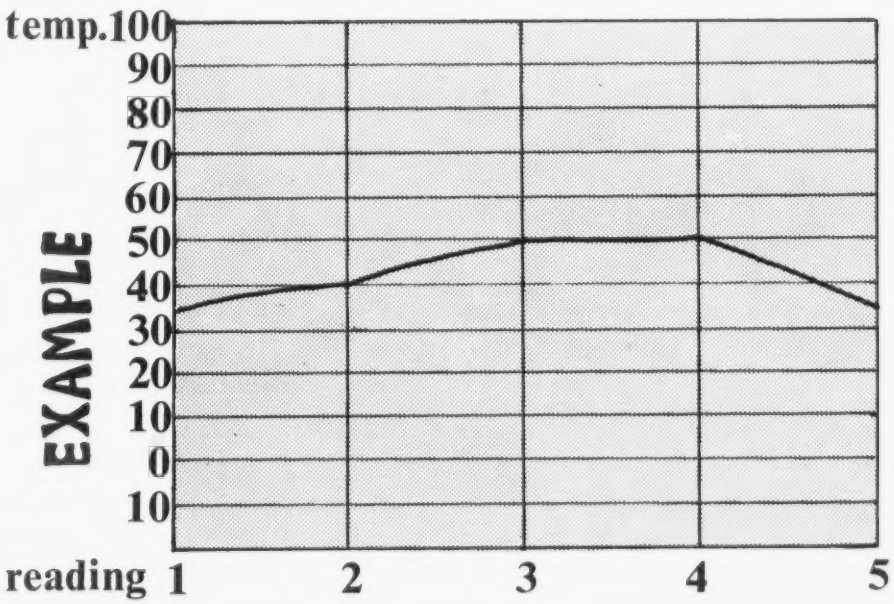
On this November 3, was the high (72°) or the low (46°) closest to the daily records for this day?



The average high and low temperatures for this day are 63° for a high average and 36° for an average low reading for a November 3. Would you say that this particular November 3 was "above average" or "below average"? How did you arrive at this decision?

AN "AVERAGE" DAY (continued)

Let's do a little research on your own. When you get up in the morning look at your thermometer at home. Record that temperature. Look at it again just before you come to school. Then, just as soon as you get home from school, look again. Record the temperature a fourth time right after you eat dinner and record a final reading just before you go to bed.



What time of day was the temperature the lowest?

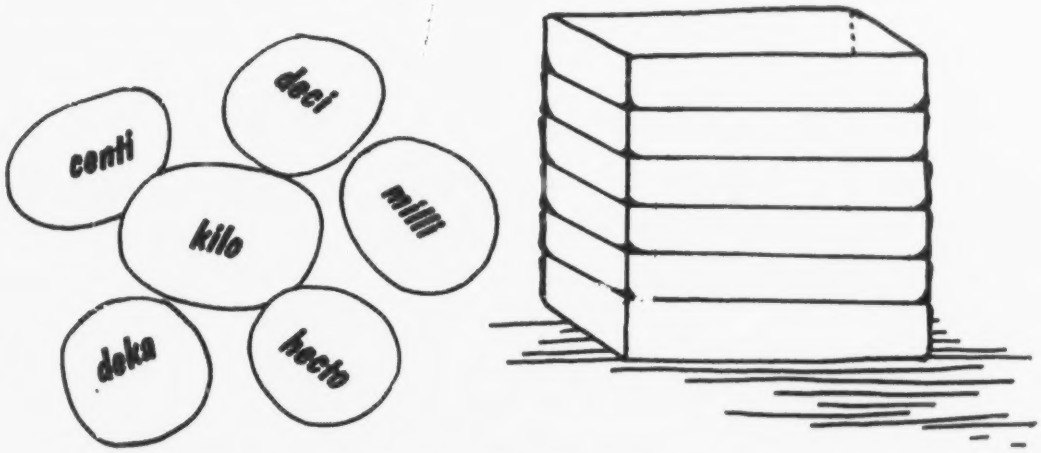
At what time of day was it the highest?

Would you say that the day was "average," "above average" or "below average"?

Find in another source (radio, TV or the newspaper) the record high and low temperatures for the day. Then put all this information together (plus any other neat "weather facts" you can think of) and prepare a short report to hand in to your teacher.

METRIC MYSTERIES

Unscramble these metric terms so that they are arranged from the smallest to the largest. Place the largest in the box on top and the smallest unit prefix on the bottom.



Match the units in each case that are closest by comparison. Draw connecting lines to show relationship between units.

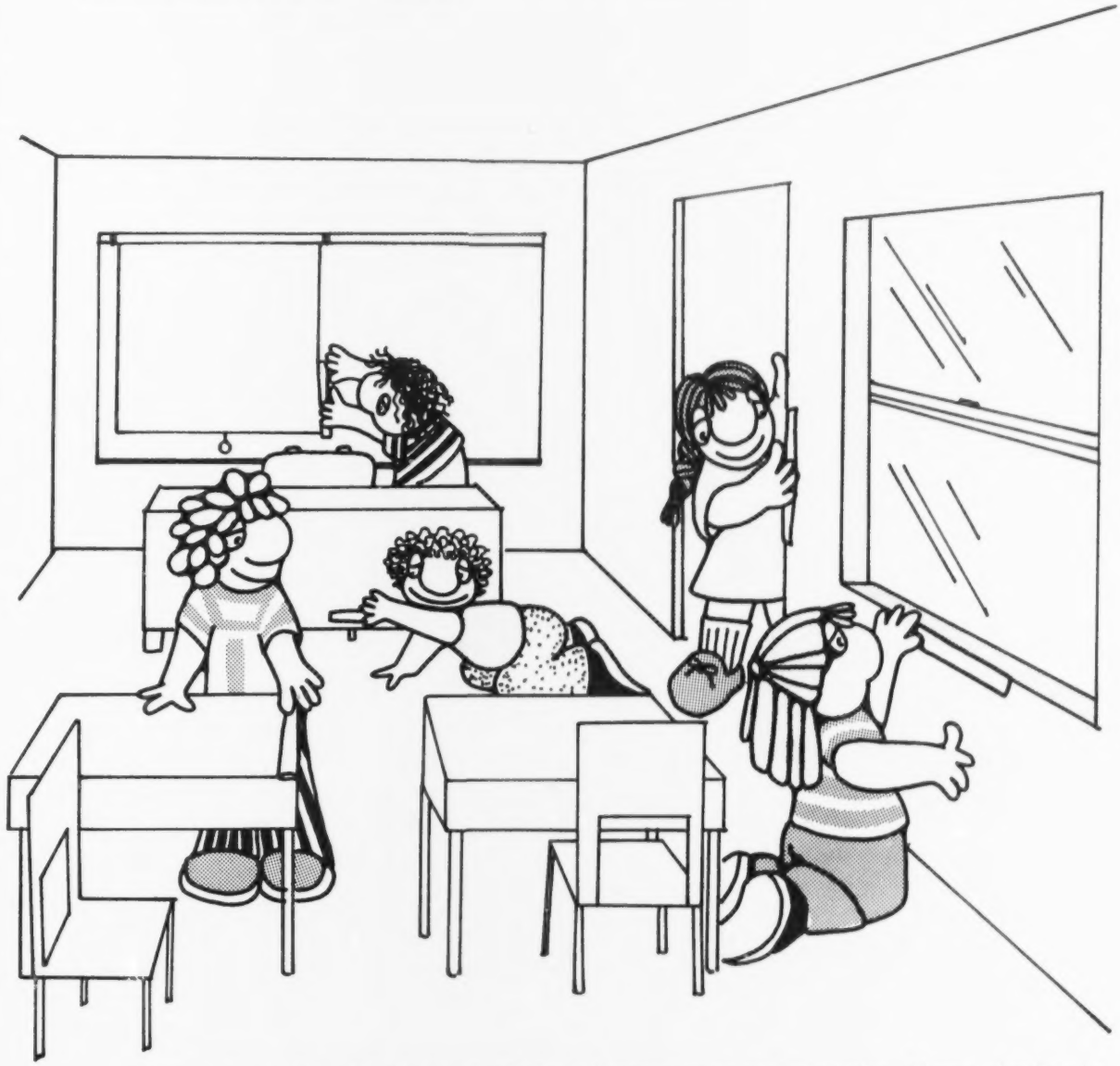
pound	yard
inch	kilogram
quart	centimeter
meter	gram
mile	kilometer
ounce	liter

Which of the metric units on this page would be appropriate for measuring each of the following?

The weight of a catfish _____
The length of a football field _____
The height of the basket in the gym _____
The amount of water in the swimming pool _____
The capacity of a car's gas tank _____
The weight of a hamburger _____
The distance from your house to school _____
The weight of a ladybug _____
The length of your thumb _____

METRIC MYSTERIES (continued)

When students are out of your room, measure with a metric stick the length of several objects in your classroom. Then post the measurements of those objects on the bulletin board. Do not in any way reveal the identity of the objects you measured. Divide students into teams with each team being given a meter stick. Their team task is to discover those objects which you measured.



Be very precise in the accuracy of your measurements. Your students will be very upset if they measure something that you've measured and get a different answer.

A REAL BUY!

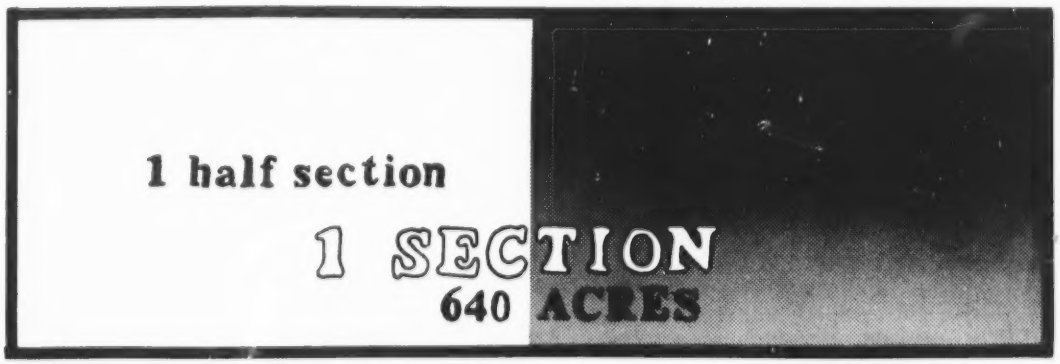
After surveyors measured the Northwest Territory following the Land Ordinance of 1787, it was decided that the land would be offered for sale to the general public and that records of the transactions would be officially kept to avoid possible further conflicts over land ownership as well as to prevent the "claim-jumping" practices of the past.

The land was sold using the following land parcels that were all based on this single standard:

1 SECTION = 640 ACRES

What measure are you familiar with that contains 640 acres?

Even if a man did have enough money to buy a whole section of land, he didn't have the farm machinery nor the modern technology that was needed to maintain such a large farm. So...land was sold in half-section tracts. How many acres were there in a half-section?



A REAL BUY (continued)

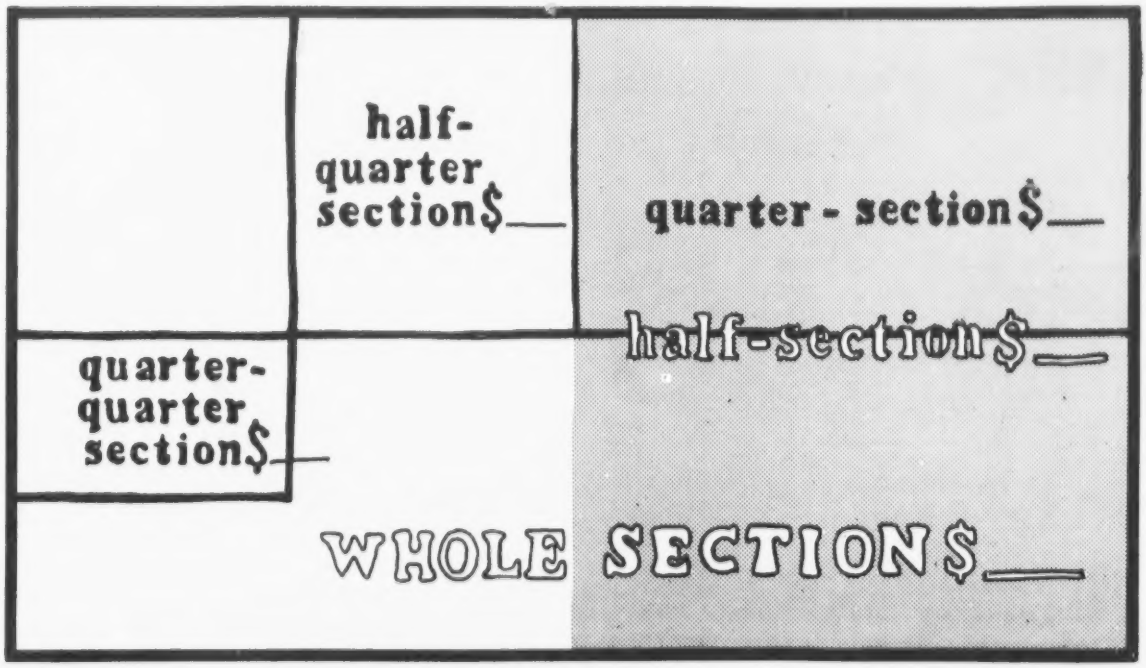
Land was also sold in quarter-sections. How many acres were there in a quarter-section of land?

A smaller farmer could buy a half-quarter section. How many acres were there in a half-quarter section?

He could even buy a quarter-quarter section, in which case he would have purchased how many acres of land?

Some of this land sold for as little as $1.25/acre. How much would a farmer have had to pay for each of these land parcels?

Whole Section = _____
Half-Section = _____
Quarter-Section = _____
Half-Quarter Section = _____
Quarter-Quarter Section = _____



A REAL BUY (continued)

That same land today is worth many times what it cost back in 1790. In fact much of that very land is worth over $4000/acre. Considering today's prices, what would a half-section of land be worth today?

How about a quarter-quarter section?

...a half-quarter section?

...a whole section?

AND FOR THOSE BEYOND.....

What percentage of an increase would exist if someone had bought some land way back then and passed it on to his heirs...who in turn passed it on to their heirs...etc...the land being handed down from one generation to the next...with the same parcel of land remaining "in the family?" The family who owned it today would have an increased investment of what percent over the original investment?

And just suppose...that all of Illinois was for sale. What would it have been worth in 1790?

What would it be worth today?

WHICH IS THE.....?

Show your tremendous knowledge of the relationship that exists between the various standards of weights and measures. Circle your response:

Which is *longest*?

1 mile | 1 kilometer | 5200 feet

Which is *longest*?

2 meters | 2.5 yards | 84 inches

Which is *heaviest*?

2600 pounds | 2 tons | 2500 kilograms

Which is *longest*?

440 yards | 400 meters | 1/4 mile

Which weighs the *least*?

.5 pound | 10 ounces | 27 grams

Which is *longest*?

2 millimeters | 2 centimeters | 2 inches

Which is the *most* money?

23 dimes | 9 quarters | 41 nickels

Which is the *latest*?

9:50 P. M. | 11:30 A. M. | noon

Which of these temperatures is the *warmest*?

10° C | -10° F | 30° F

Which is the *most*?

2 liters | 1/2 gallon | 9 pints

Which is the *least*?

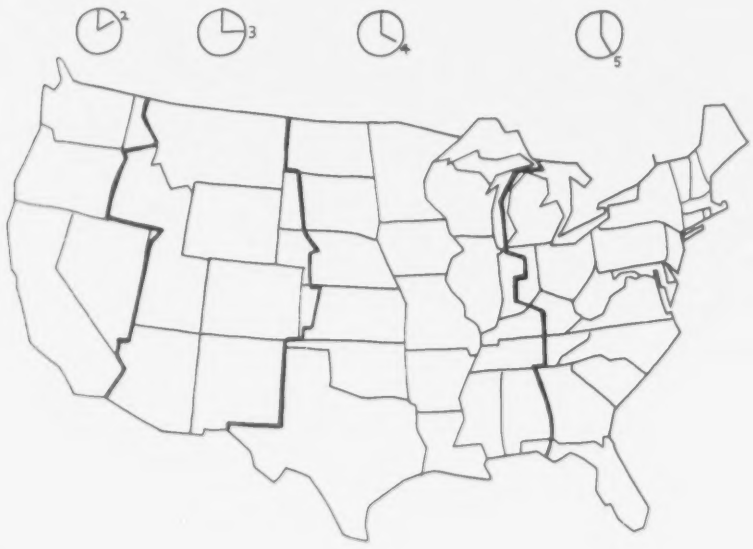
14 cups | 1 gallon | 1.5 liters

Which is the *least* amount of $$$$?

56 nickels | $5 bill | 17 quarters

CHANGING TIMES

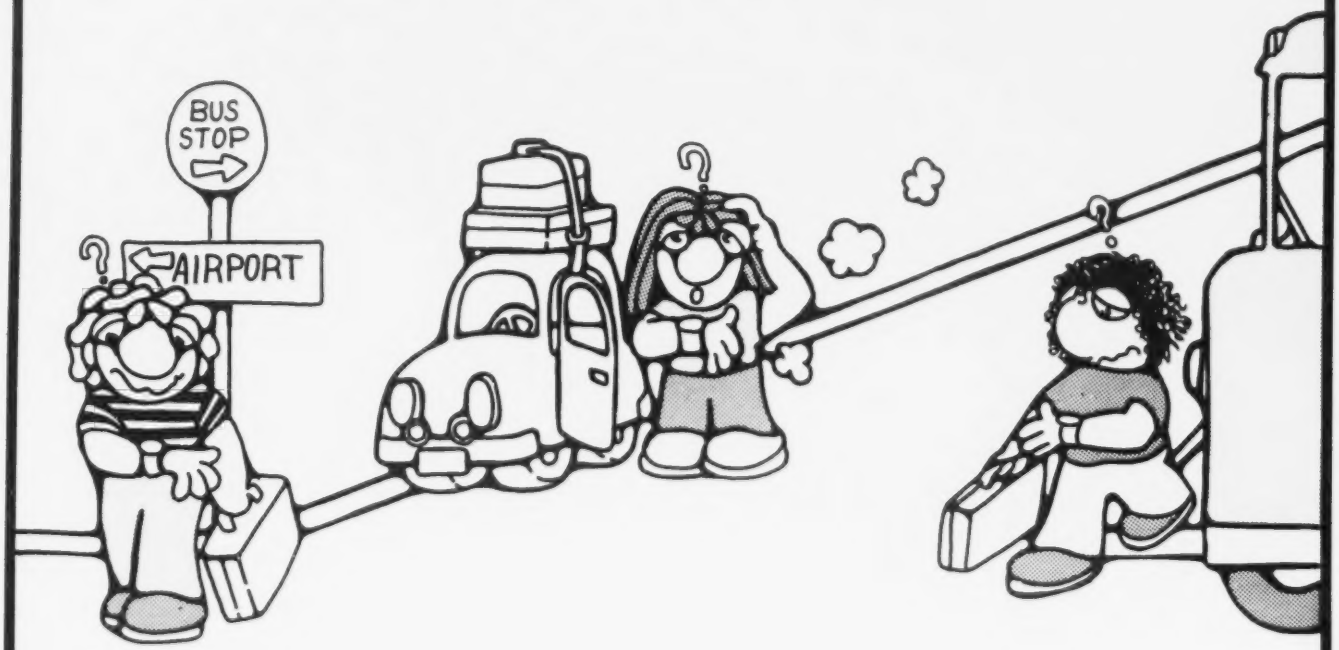
Look closely at the various time zones that cover the continental United States. Then find a map that locates its major cities. Using the map below, add or subtract hours to get the correct answer in each case.



1. If it is 3:00 A.M. in Chicago, Illinois, what time is it in New York City? _____
2. If it is 2:00 P.M. in Miami, Florida, what time is it in Kansas City, Missouri? _____
3. What time is it in Los Angeles when it is 4:30 A.M. in Atlanta, Georgia? _____
4. What time is it in Salt Lake City, Utah, when it's 11:30 A.M. in New Orleans, Louisiana? _____
5. What time is it in Columbus, Ohio, when it is 11:45 P.M. in Duluth, Minnesota? _____
6. If it is noon in our nation's capital, what time is it in Houston, Texas? _____
7. What time is it in New York City when it is 2:25 A.M. in Denver, Colorado? _____
8. What time is in Boston, Massachusetts, when it's 2:45 A.M. in Birmingham, Alabama? _____
9. If it's 3:45 P.M. in Dallas, Texas, what time is it in Las Vegas, Nevada? _____
10. What time is it in San Francisco when it's 7:30 A.M. in Tulsa, Oklahoma? _____

CHANGING TIMES (continued)

11. If it is 11:40 in Seattle, Washington, what time is it in Tampa, Florida? _____
12. It if is 3:10 A.M. in Pittsburgh, Pennsylvania, what time is it in Salem, Oregon? _____
13. What time is it in Tucson, Arizona, when it is 8:15 A.M. in St. Louis, Missouri? _____
14. If you lived in Los Angeles and wanted to call your friend in Boston to wish her a "Happy New Year" precisely at 12:00 in Boston, what time should you place your call? _____
15. If it is 3:00 P.M. in Lansing, Michigan, what time is it in San Antonio, Texas? _____
16. If it is 9:35 P.M. in New Orleans, what time is it in Seattle? _____
17. What time is it in Minneapolis if it is 8:18 A.M. in Phoenix? _____
18. If if is 5:00 in the morning in Tampa, what time is it in San Diego? _____
19. If it is 9:00 A.M. in Raleigh, what time is it where you live? _____
20. A plane leaves from Phoenix at 1:30 P.M. and is in flight for two and one-half hours. If that plane lands in Nashville, Tennessee, at what time should the passengers set their watches if they want to have the correct time? _____



AS THE CROW FLIES

Locate these major U.S. cities on the map below. Then calculate the air distance in miles between the cities in the problems below (using the scale of miles). Place your answer in the blank space provided.

⟷ = 200 miles

Chicago to New York _____

Los Angeles to Denver _____

Dallas to St. Louis _____

Washington, D.C. to New Orleans _____

Kansas City to Boston _____

Atlanta to Minneapolis _____

Seattle to Miami _____

Portland to San Francisco _____

Philadelphia to Houston _____

Tampa to San Diego _____

Buffalo to Birmingham _____

Nashville to Phoenix _____

Tucson to Pittsburgh _____

Las Vegas to Cleveland _____

First estimate, then measure and finally record your comparisons for the following:

	ESTIMATE	Units	ACTUAL	Units
diagonal of your TV set				
height of a bicycle				
perimeter of the school				
weight of your pencil				

First estimate, then measure and finally record your comparisons for the following:

	Estimate	Units	ACTUAL	Units
the length of your shoe				
the depth of the waste basket				
your teacher's height				
the distance from your desk to the door				
distance across the football field				

First estimate, then measure and finally record your comparisons for the following:

	Estimate	Units	ACTUAL	Units
length of your bed				
length of your toothbrush				
distance across your plate				
perimeter of your house				

First estimate, then measure and finally record your comparisons for the following:

	Estimate	Units	ACTUAL	Units
the length of your pencil				
the width of your math book				
the height of a 16-oz. pop bottle				
the distance around a tree				

_____ (student)

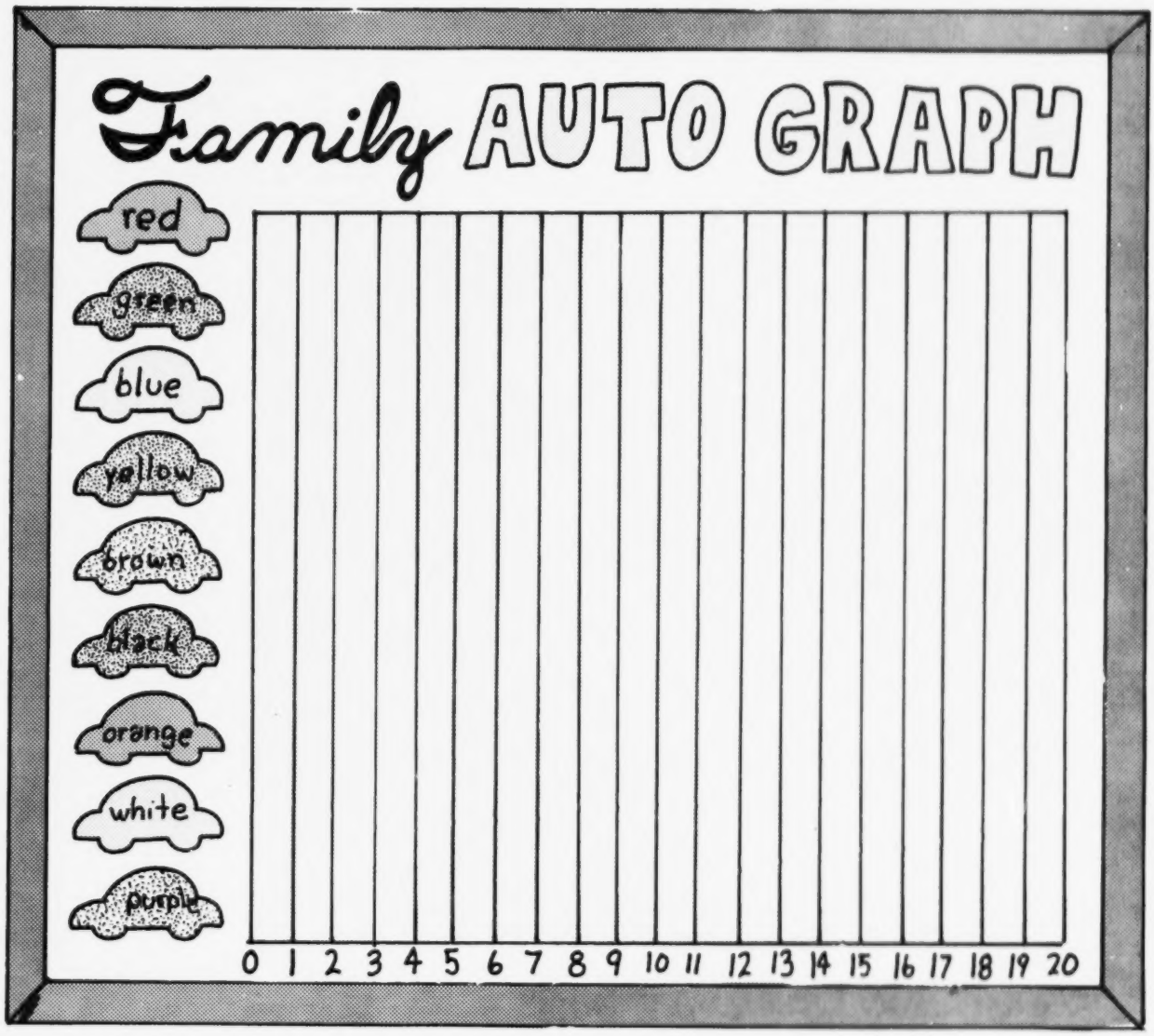
You've Really Measured Up in Math

_____ (from)

_____ (student)

was with us every inch of the way

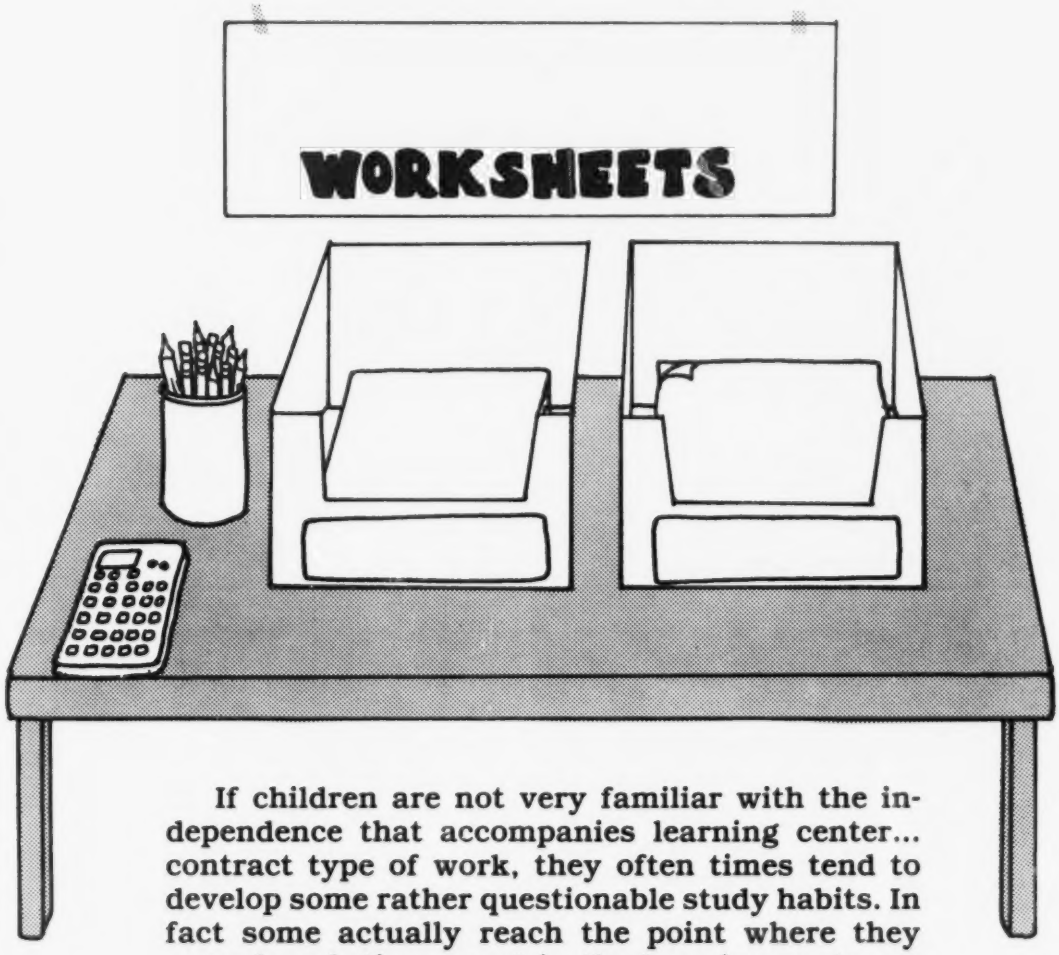
_____ (from)



Here's a bulletin board idea that is useful in introducing students to the skill of charting and graphing. The background is made from some light colored construction paper or oak tag. Create actual grid for recording information from a darker more contrasting colored paper. Cut out shapes of cars from construction paper. Letters for the title should also be made from colorful paper.

You are now ready to "poll" your class on the various colors of cars they have in their families. It is appropriate to first create a simple distribution chart on the chalkboard for the various colors before placing the compiled information on the bar graph. Once all the information has been gathered, ask different students to go to the bulletin board and fill in the appropriate line length according to the information he or she has. It will look neater if you use black construction paper for the bar, but a black felt tipped marker will be much easier.

GRAPHING/STATISTICS/PROBABILITY CENTER



If children are not very familiar with the independence that accompanies learning center... contract type of work, they often times tend to develop some rather questionable study habits. In fact some actually reach the point where they regard such time spent in the learning center as merely "free time...fun time."

To help overcome such an atmosphere the teacher should first spend enough class time explaining fully just what is expected, both in terms of accomplishment and also behavior.

Attractive bulletin boards also help to spark the interest of young minds in the presentation of certain material. It might prove also beneficial to place a related bulletin board message near the learning center itself to provide further stimulation.

THEIR FAVORITE FOOD

One day during recess several of the students in Miss Robinson's 5th grade class somehow got on the subject of favorite foods. Todd, Teri Ann and Brenda all insisted that "...pizza was the greatest..." while Billy, Mary Jo and Becky were just as certain that "...a burger and fries had them all beat!" Tommy then chimed in that "..they were all crazy and everyone who knows anything, knows that steak is best!"

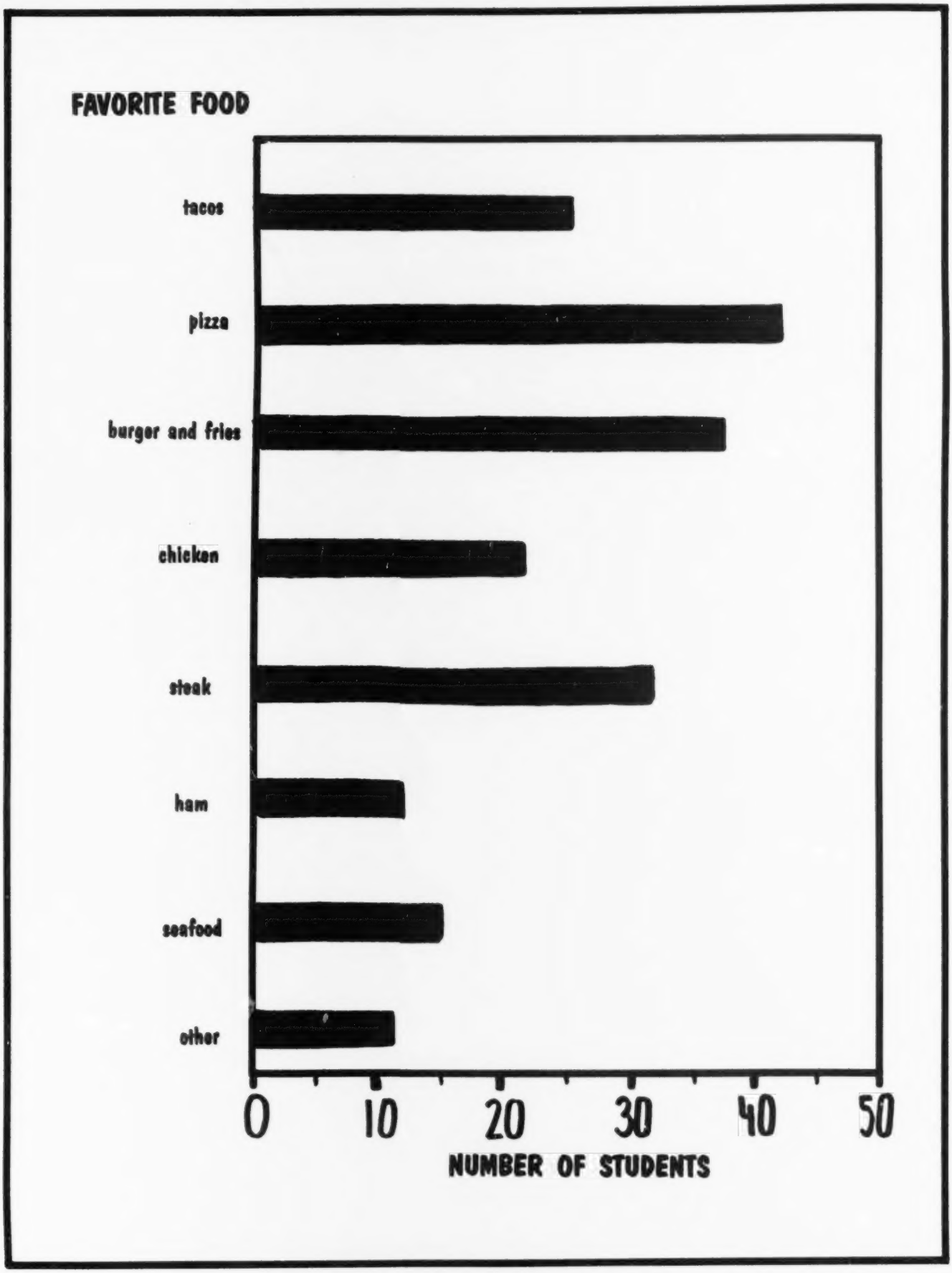
Miss Robinson overheard this little conversation and decided to step in before the discussion went any further. "Rather than just stand here and argue about it, let's ask all the kids in the fifth grade. This still won't change any of your minds, nor will it prove anything about which food really *is* best; but it might be fun to find out for your own information about the tastes of our fifth grade students."

Since the children all agreed, Miss Robinson gave them instructions on how to conduct a *survey*. A *survey* is really a gathering of the opinions of people concerning a topic (like "favorite food"). You can go ask all of the people in a particular group (like the whole 5th grade)...or you may be able to get a pretty good idea of their choices simply by asking a few.

For example, if you wanted to ask the question, "What is the favorite food of 5th graders in America?" you wouldn't have to ask *every* 5th grade kid in the United States. You could take samples of opinions of kids from various parts of the country and you would have a pretty good idea of their choice.

Once you have all of this information, you need to put it down on paper so that it will be meaningful to others. There are a number of ways you can show this. One of the ways is through the use of a *bar graph*.

On the next page you will see the results of the *survey* of Miss Robinson's class. There are eight sections of the fifth grade in Washington Elementary School. The average class size is from 23-26 students per class.


FAVORITE FOOD
tacos
pizza
burger and fries
chicken
steak
ham
seafood
other
0
10
20
30
40
50
NUMBER OF STUDENTS

THEIR FAVORITE FOOD (continued)

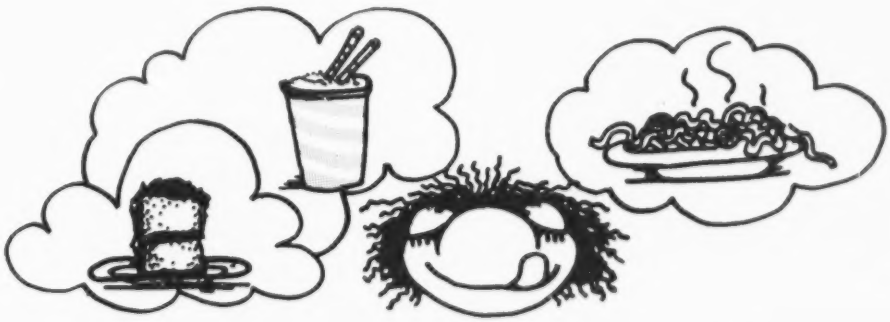
How many kids were polled in this little *survey*?

If there are 204 kids in the 5th grade at Washington Elementary, why weren't 204 kids *surveyed*?

What conclusions can you draw from the results of this little *survey*?

What was the favorite food of 5th graders at Washington Elementary?

What do you suppose some of those "other" favorite foods included?



Do you think these results would be the same if the poll were to be conducted "nationally"?

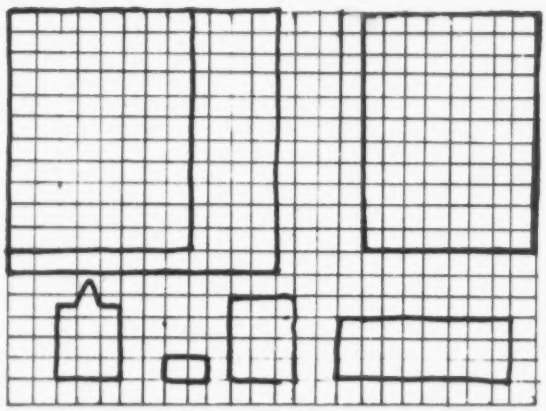
Conduct your own *survey* just like the kids in Miss Robinson's class did. You can survey just the members or your class...or you can get some friends to help and survey the whole grade you are in...or you can become really ambitious and survey the entire school (if it isn't too big). Just be sure to follow the same steps Miss Robinson's class used. When you're finished, place your findings on a bar graph similar to the one they used.

What are some other reasons for people conducting *surveys*?

SCALING, SCALING....

If your teacher asked you to make a drawing of your desk and all of the things that are in it, you'd probably look inside first to see just how your books, papers and other school supplies are arranged. Then you would probably attempt to make a drawing that looked somewhat like that arrangement. But how really *accurate* would your drawing be? First, would your math book be the same size in your drawing as it really is when compared to the area it occupies in your desk? Probably not!

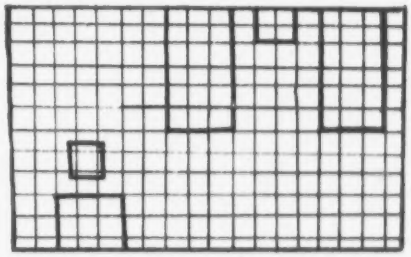
To make your drawing more accurate, you can use a *grid* like the one on this page. Your teacher may have some graph paper, or you can even make up your own. Use a ruler to measure and let each box represent one inch in real length of your desk. Then mark off those areas that are occupied by the various things in your desk,and your drawing should be much more accurate than it was the first time.



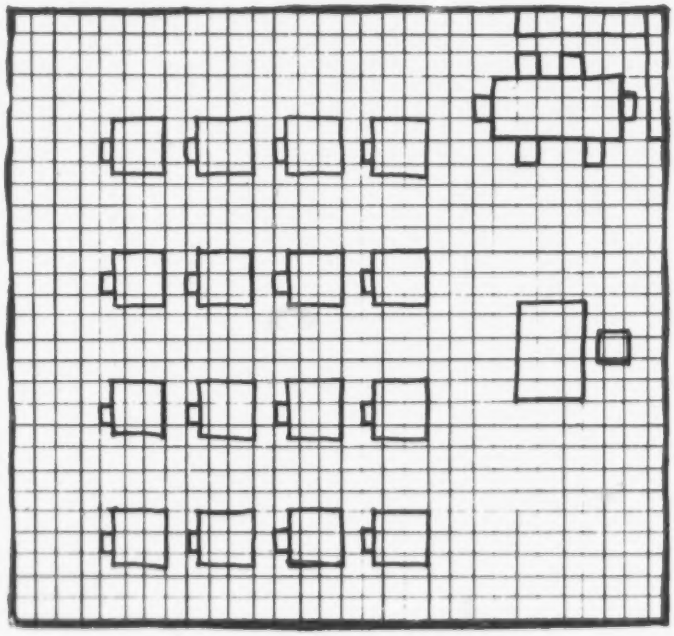
Once you've finished this, make a scale drawing of your locker and its contents. Don't forget to measure. This time you may have to let the length of one of those little boxes represent two or even three inches. Remember to be consistent throughout your measurements.

SCALING, SCALING (continued)

How about making a *scale drawing* of your room at home. Again, be sure to change your *scale* or you won't be able to get the whole drawing on a single sheet of paper.



A good class project would be to create a *scale drawing* of your entire classroom...then maybe even the WHOLE SCHOOL!

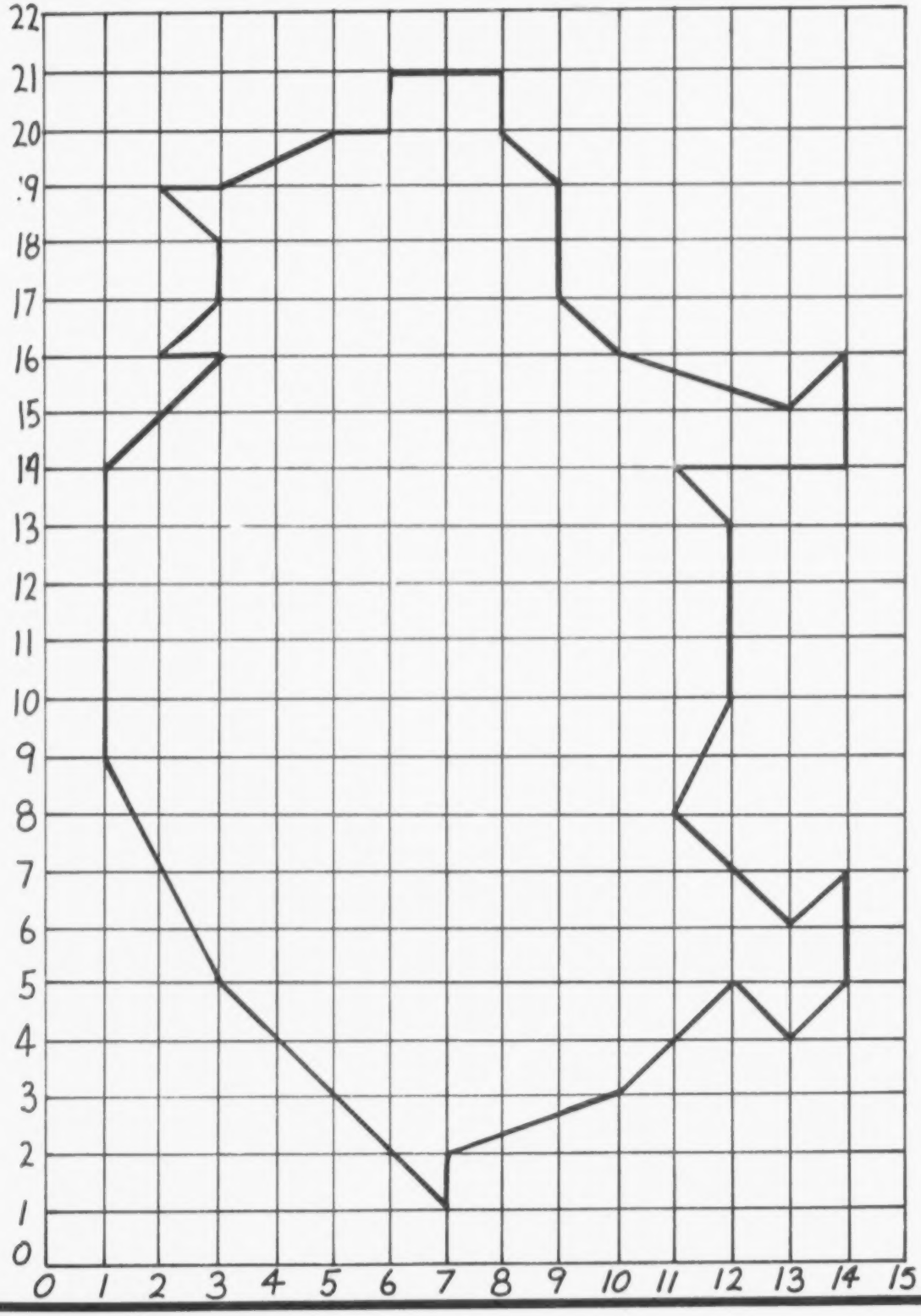


A REALLY AMBITIOUS project that should be worth extra credit would be to make a scale drawing of the whole block on which you live. Be sure to include all the buildings and houses and other things that occupy space.

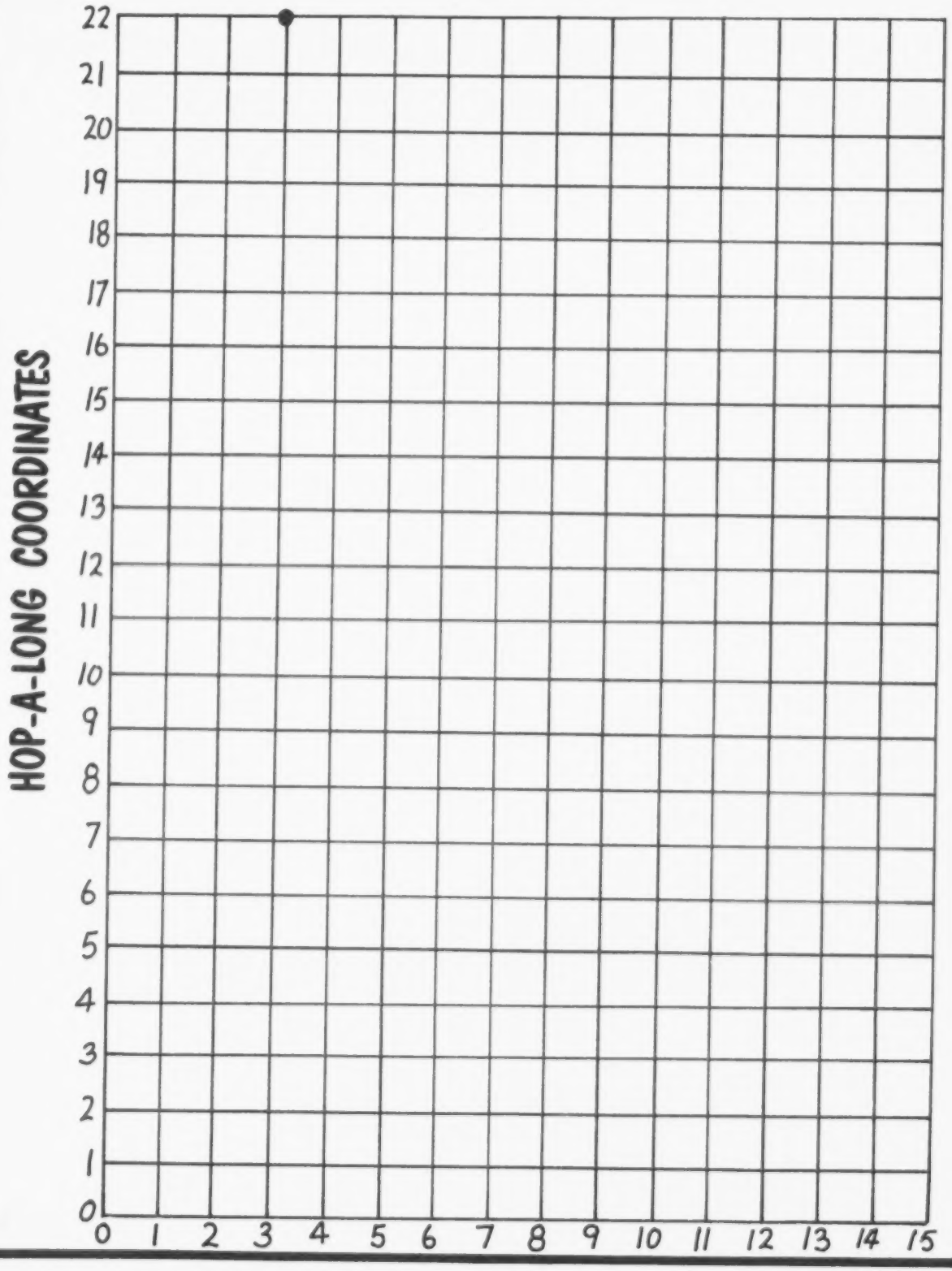
So you're saying by now, "What's next, the whole town? Then what...the entire state? ...all of America...the whole world?" No, we won't ask that of you, but are you starting to get the idea of how people who make maps go about doing their work?

CHARTING PORKY

The nose begins at (6, 21), then extends to (8, 21). Continue in a clockwise fashion in completing instructions on the location of the coordinates that will complete the pig in the drawing below.



Create your own animal by connecting lines between these coordinates. The first dot is already in place for you at (3,22). Your task is to complete the rest of the drawing. (4,22) (5,21) (5,16) (4,15) (7,15) (10,18) (12,18) (13,18) (13,15) (12,14) (11,14) (10,15) (9,15) (9,14) (10,13) (10,12) (8,10) (8,9) (11,6) (11,4) (12,5) (13,5) (14,4) (14,3) (13,2) (12,2) (11,3) (10,2) (7,2) (6,3) (5,2) (2,2) (2,3) (3,3) (3,8) (4,9) (4,10) (2,12) (2,13) (3,14) (3,15) (2,16) (2,21)



THEIR FAVORITE COLOR

Have you ever had anybody ask you the burning question, "What's your favorite color?" I bet you have one, too. Is it blue (a popular one)?...or red?...or green?...or perhaps black.

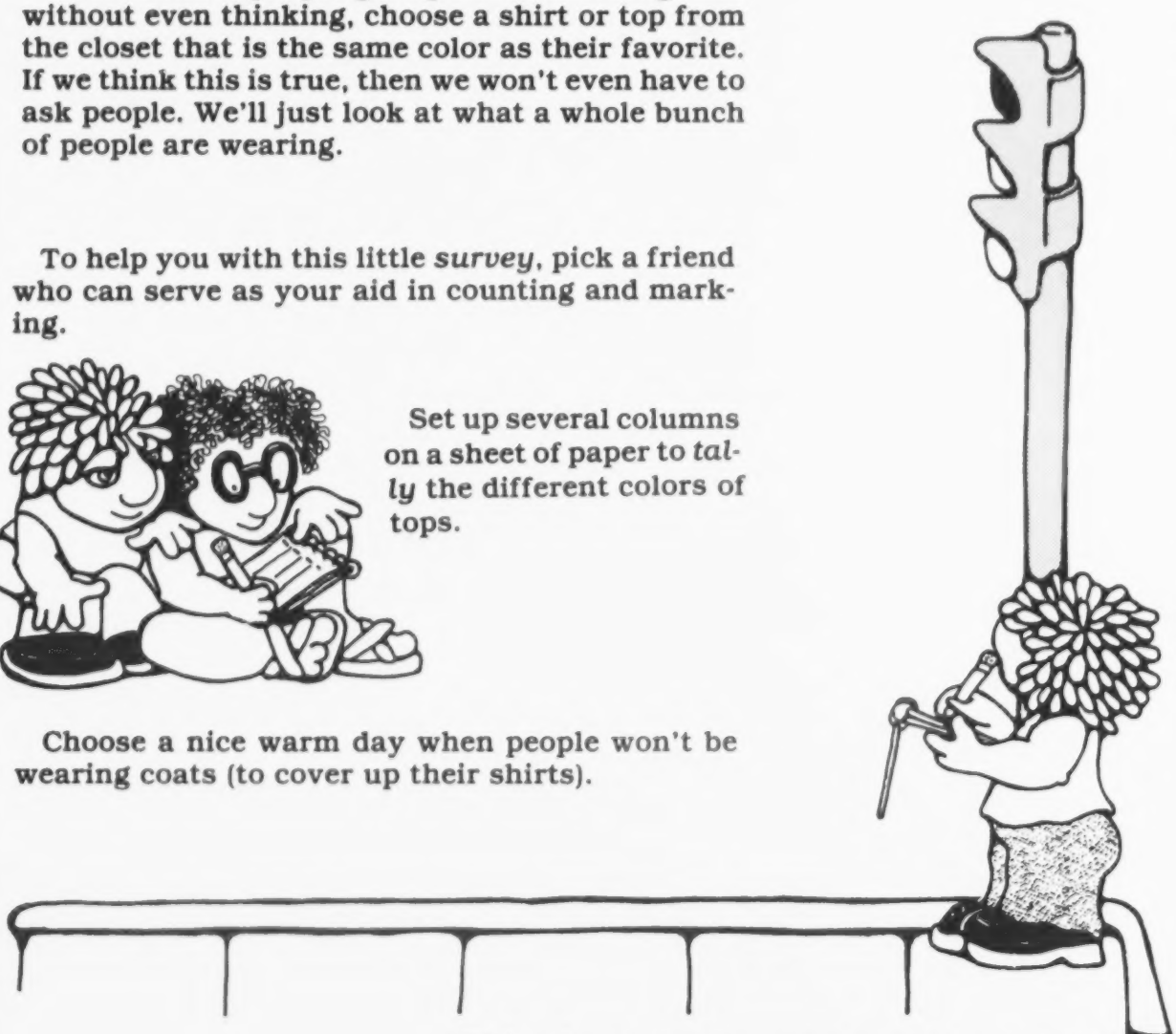
Have you ever wondered what is the most popular choice among people's "favorite color"? Well, one way to find out would be to just go up and ask them, "Hey, you, what's your favorite color?" If that sounds crazy, maybe there's another way.

Lots of times people get up in the morning, and without even thinking, choose a shirt or top from the closet that is the same color as their favorite. If we think this is true, then we won't even have to ask people. We'll just look at what a whole bunch of people are wearing.

To help you with this little *survey*, pick a friend who can serve as your aid in counting and marking.

Set up several columns on a sheet of paper to *tally* the different colors of tops.

Choose a nice warm day when people won't be wearing coats (to cover up their shirts).



Pick a busy street corner (or maybe the edge of the school grounds) or some place where you know people will be walking past.

THEIR FAVORITE COLOR (continued)

As each person goes by, you or your friend should make a mark on your sheet in the right column. You could separate males from females, but that might get you all fouled up. You can try that next time.

You'll have to stay there more than just a few minutes, because to conduct a really good survey, you need a large *sample.*

When you think you can't stand doing surveys any longer, go home armed with your *data* and figure out what you've got.

Count the tally marks. What color was #1? Which choice was the second most popular, etc.?

Can you say with certainty now that "More people like blue tops (or whatever choice was #1) than any other"?

What are some things that might have made your survey invalid? What if several people chose another shirt because their favorite was dirty...or in the clothes dryer...or was torn?

To check your results, you might try the whole thing over again.

For those of you are are really into *statistics*, change your results to percentages (like they do on TV when they say "57 percent of the dentists surveyed chose Crest.")

STATUS

The word has a certain magic ring to it in our society. It really means a lot of things...the kind of house you live in, the kind of car you drive, how much education you have, the clothes you wear, the company you keep...and more...much more. But the bottom line usually boils down to money. "How much does it cost?"

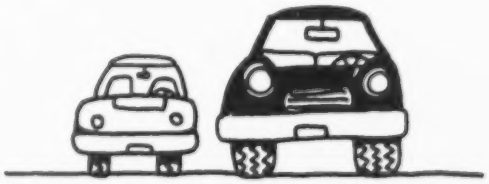
Look at each of the groups of "similars" below and on the next page and decide which in each group has the *greatest status* (based on the simple fact that it costs the most.) Place the number 1 beside that choice; then a 2 beside the second choice of the status seeker, etc. Continue this rating all the way through the number 5, which would be the last choice of the status seeker. If you are unfamiliar with the actual dollar figure that should be associated with each, you may have to do a little checking around. Ask your parents or your teacher for help.

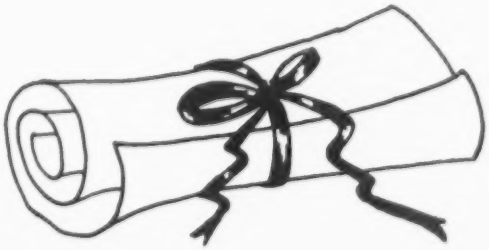
When you're all done with your rating, look back and try to decide which of these categories is *most important* to you at this point.

Which status do you think is *most important* to most adults?

Transportation:

_____Cadillac
_____Toyota
_____Monte Carlo
_____Buick Electra
_____Mercedes Benz



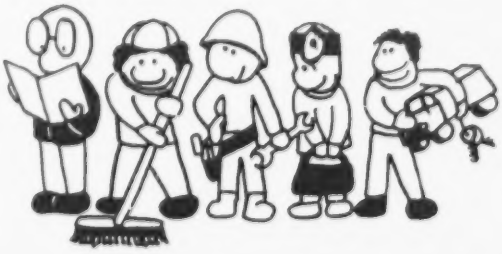


Education:

_____Master's Degree
_____High School Diploma
_____Doctorate
_____Junior High Diploma
_____Bachelor of Arts Degree

Occupations:

_____Brain Surgeon
_____Sanitation Engineer
_____Factory Worker
_____Teacher
_____Truck Driver



Shelters:

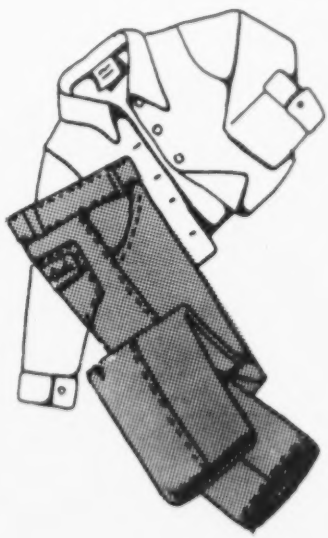
_____Ocean-front Condominium
_____Split Level
_____Colonial Mansion
_____Government Housing Project
_____Apartment

Clothing:

_____Botony 500
_____Made in Taiwan
_____Sears
_____Cricketeer
_____Neiman-Marcus

Foods:

_____Lobster
_____Hamburger
_____Roast
_____Steak
_____Vegetable Protein Meat



Vacations:

_____Long Weekend
_____Two-Month Tour of USA
_____Two Weeks at Aspen
_____One Week in New England
_____Summer in Europe

What other status symbols can you think of?

_____

_____

_____

What makes them so?

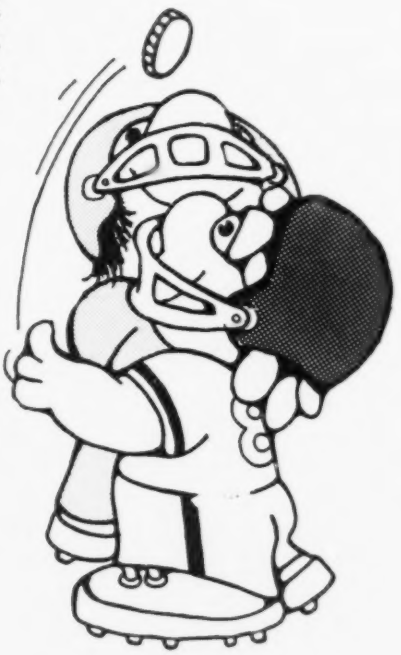
_____

_____

THE OTHER SIDE OF THE COIN

You've seen the two captains of football teams meeting in the center of the field with the officials before the game for the traditional "toss of the coin," which determines who gets the ball first, which team "gets the wind" and "which team gets its choice of goals."

Have you ever wondered how the captain decides whether to call "heads" or "tails"? Is heads really any better than tails? What if he called "heads" last time and won? Should he stick with "heads"...or should he switch to tails? What should he choose if he lost the flip before the last game by choosing "heads"?



If a captain called "heads" every time, how many times would you expect him to win the flip this season if his team plays ten games?

Try it yourself. Toss the coin ten times and record the number of times you get heads and the number of times you get tails.

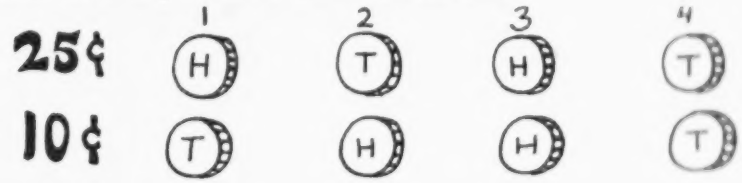
Try this experiment a second time. Did you get the same number of heads? Try the experiment again a third time. Can you come to any conclusions about this little experiment? Write down your "theory" in the space provided below.

THE OTHER SIDE OF THE COIN (continued)

What kind of result would you expect if you flipped the coin 100 times? Find a friend to help and try it!

What if you had two coins and flipped them both? Let's say you have a quarter and a dime. If you flip them both, what are the *odds* that they will both come up heads?

Look at the possible combinations:



Using the above information, if you flipped both coins 20 times, how many times would you expect the flip to result in both coins turning up heads?

How did you arrive at this "theory"?

_____

_____

_____

_____

_____

Get a friend to help and try it.

COUNT ME IN!

Below are some population figures of Calvin County. They represent a comparison of the 1970 census with the census taken in 1980.

Do you know what the word *census* means?

Every ten years the government conducts a head count of all the people in the United States.
So you wonder why the government spends millions of dollars just to find out how many people there are in the United States. Good question. There are really some pretty good reasons for doing this. Among them is to decide how much money each city gets to help provide the governmental services for the people who live there.
Your next question is probably, "What are *governmental services*"? Ask your teacher. Discuss *governmental services* in class.

What are some other reasons for the government wanting to know how many people there are and where they all live?

City	1980	1970
Hoopston	728	734
Johnson City	1391	1297
Harmony	479	576
Pilot Grove	1131	1047
Wilcox	1840	1748
Bowen	522	489
Browning	1819	1701
Rockport	1261	1036
Montebello	4138	3379
Rocky Creek	527	610
Carthage	2970	3350
Sonora	616	576
Warsaw	1406	1284
Pontoosuc Village	261	226

YOU CAN COUNT ON ME (continued)

What was the total population of Calvin County in 1980?

_____

How does that figure compare with the population of Calvin County in 1970?

_____

_____

_____

Which towns have increased in population? _____

_____

_____

Which have decreased (gone down) in population? _____

_____

_____

Which city had the most people in 1970?

Which city is the largest now?

Which city has gone down the most in population?

What does all this mean to the residents of Calvin County?

_____

_____

_____

_____

_____

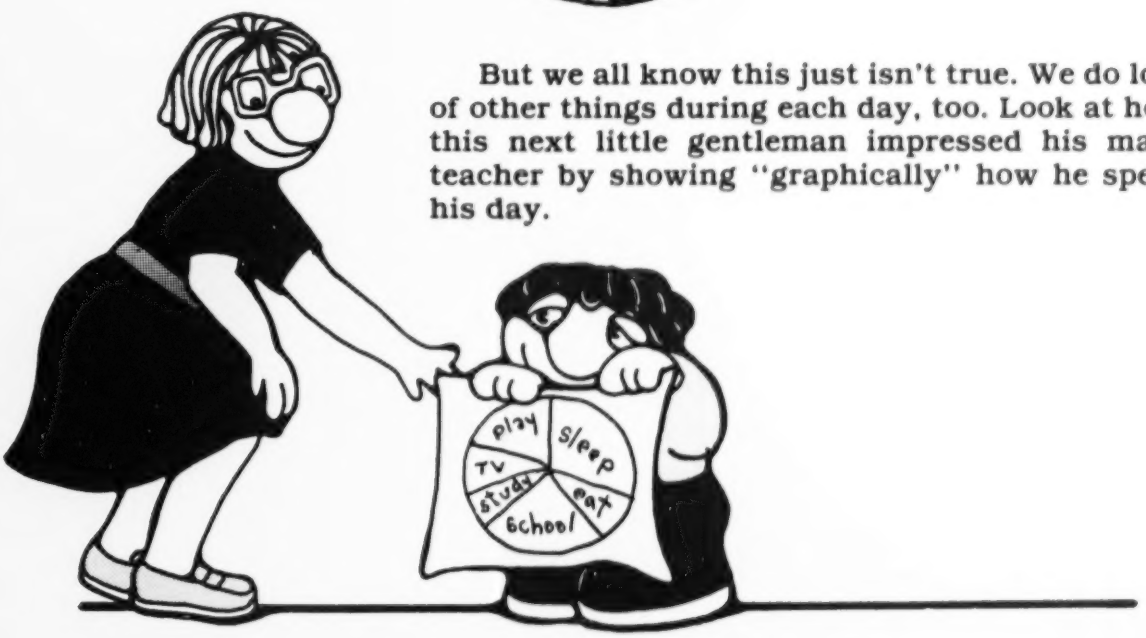
Find out about the kinds of *governmental services* that are supported by our tax dollars.

A WELL-ROUNDED DAY...

Have you ever sat down and really thought about how much of your day you spend eating...and sleeping...and watching TV...and even studying?

We can let a circle stand for a whole 24-hour day (and night). Then we can mark off the sections of that circle (much like cutting a pie) that stand for how much of each day we spend doing different things. For example, if you spent 12 hours eating and 12 hours sleeping, your graph might look like this:

But we all know this just isn't true. We do lots of other things during each day, too. Look at how this next little gentleman impressed his math teacher by showing "graphically" how he spent his day.



A WELL-ROUNDED DAY (continued)

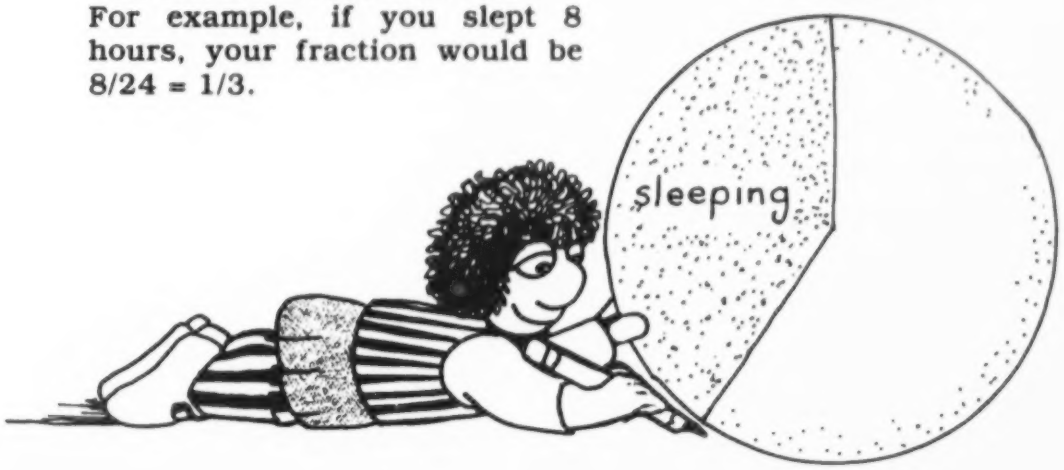
To picture your own day, get a 12-inch pizza wheel cut from tagboard from your teacher. Then do the following:

1. Keep track of the approximate times you spend doing different things in the next 24 hours.

2. To make it easier (and so you won't have to try to remember) write down the times.

3. Then add the totals in each category (eating, sleeping, watching TV, etc.)

4. Change each total to a fraction with a demonimator of 24 (since that's how many hours there are in a day) and then reduce the fraction to its lowest terms.
   For example, if you slept 8 hours, your fraction would be 8/24 = 1/3.



5. Mark off the various "pieces" of your pie on the circle and label. In the example above 1/3 of the circle should be marked off and labeled "sleeping."

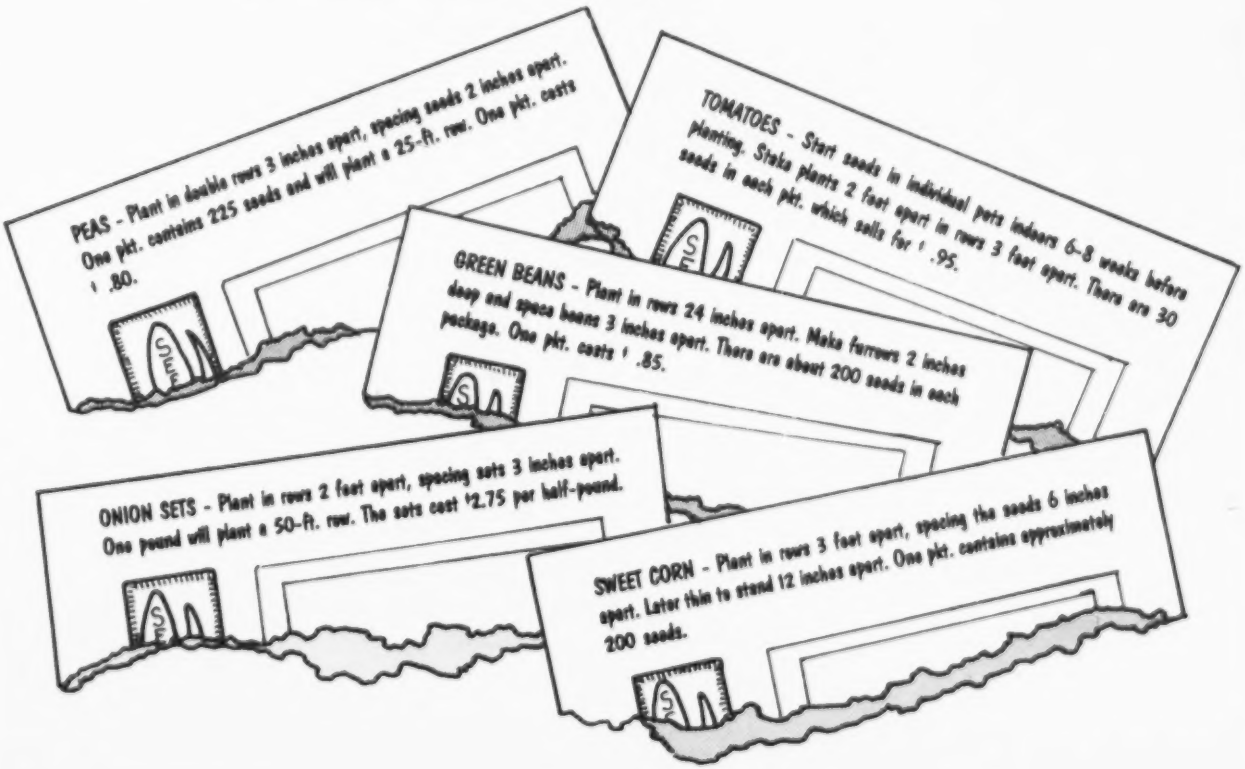
HOW DOES YOUR GARDEN GROW?

When Tammy and Chad asked their father if they could help with the family garden, he told them, "I'll do more than that. I'll give you two an entire section of the garden. You can plan the whole thing. I'll even buy the seed. Then you can plant it and take care of it all summer long. You can even set up a stand and sell what you produce and keep the money."

Well, you certainly can't beat a deal like that! So, Tammy and Chad began looking through the seed catalog. They decided to "weed out" several of the offerings and choose from the following vegetables: tomatoes, green beans, peas, sweet corn, radishes and onions. The burning question was...How much of each?

You see a scale drawing on the next page of the plot their father had given to them.

Below you see portions of the labels.

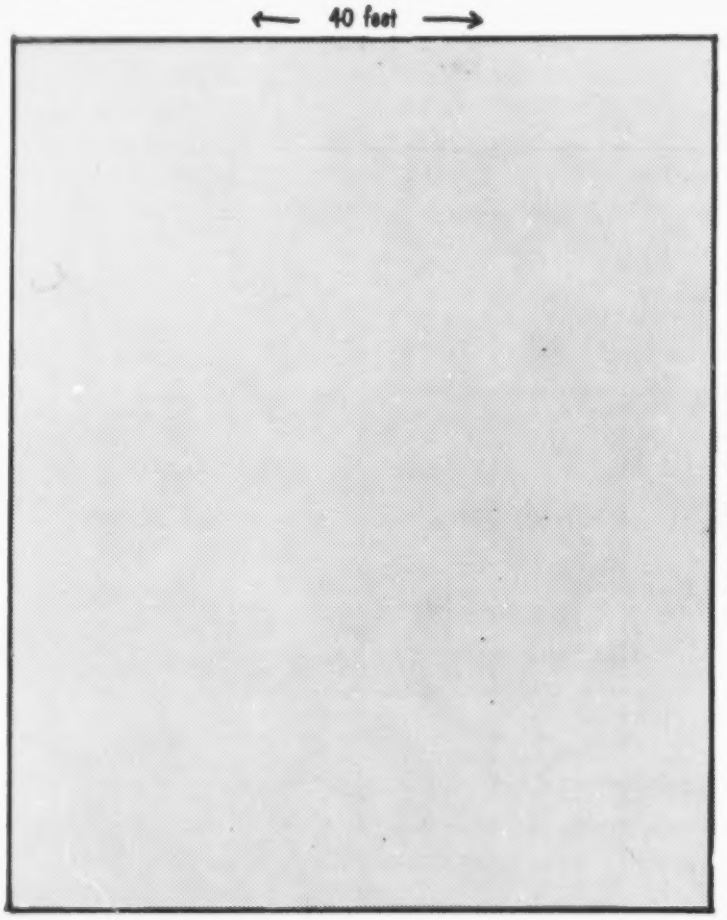

PEAS - Plant in double rows 3 inches apart, spacing seeds 2 inches apart. One pkt. contains 225 seeds and will plant a 25-ft. row. One pkt. costs ¹ .80.
TOMATOES - Start seeds in individual pots indoors 6-8 weeks before planting. Stake plants 2 feet apart in rows 3 feet apart. There are 30 seeds in each pkt. which sells for ¹ .95.
GREEN BEANS - Plant in rows 24 inches apart. Make furrows 2 inches deep and space beans 3 inches apart. There are about 200 seeds in each package. One pkt. costs ¹ .85.
ONION SETS - Plant in rows 2 feet apart, spacing sets 3 inches apart. One pound will plant a 50-ft. row. The sets cost ¹2.75 per half-pound.
SWEET CORN - Plant in rows 3 feet apart, spacing the seeds 6 inches apart. Later thin to stand 12 inches apart. One pkt. contains approximately 200 seeds.

HOW DOES YOUR GARDEN GROW (continued)

Decide with a friend the layout you would suggest to Tammy and Chad. Prepare a drawing that will show your final decisions on *what* you want to plant, on *how much* you want to buy and on *where* you want to plant each of the vegetables.

GARDEN PLOT

1 inch = 10 feet



When you have finished planning your garden, figure out how much money they should charge for each item at their "roadside stand" in order to make money.

To do this you'll no doubt need to check in some grocery stores to see what they charge. Then you will probably want to advise them to charge just a little bit less.

Why should they want to do this?

If you do your checking in the middle of winter, why won't this give you a very good idea of what you should tell these kids to charge?

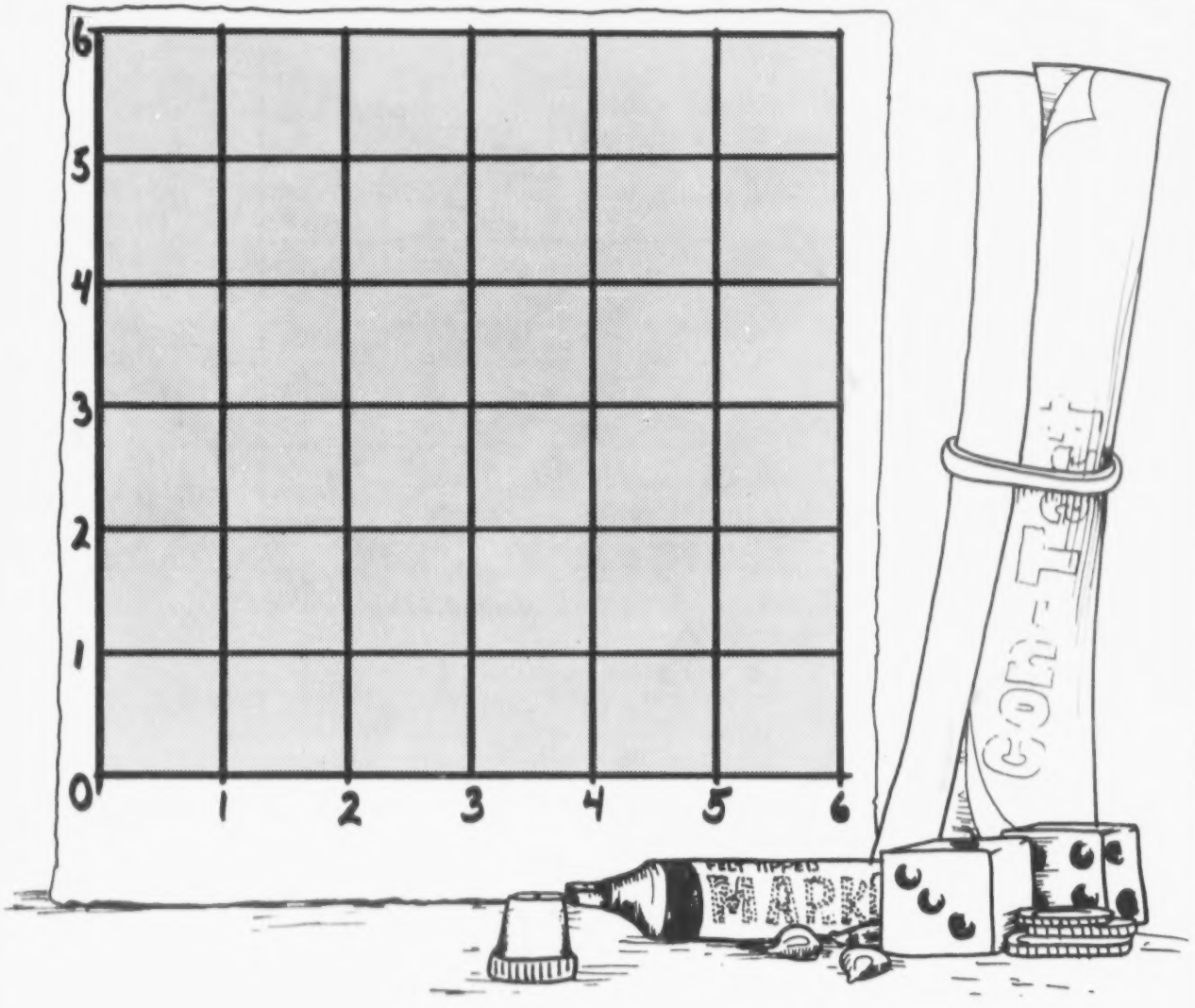
To estimate just how much Tammy and Chad are going to make this summer, what other facts would you need to know?

COORDINATE TIC-TAC

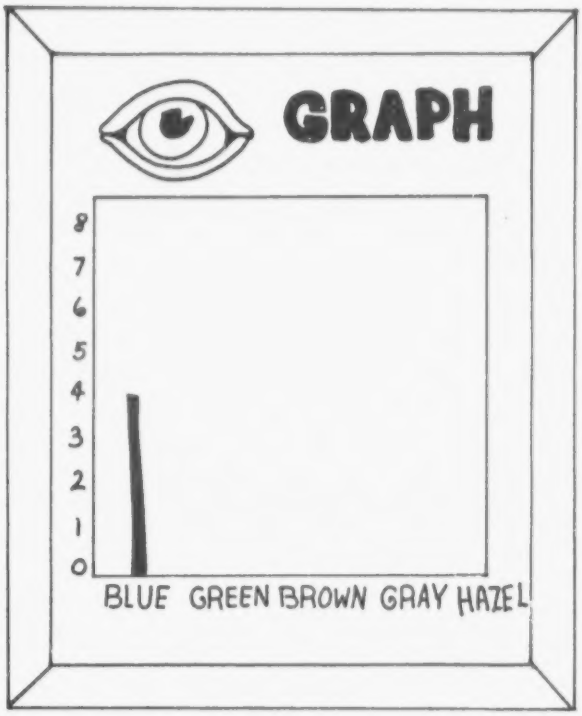
Construct game boards from tagboard similar to the board shown below. Draw a grid with black felt tipped marker and cover with Con-Tact paper to ensure durability. Also needed is a pair of dice plus several small tokens (coins, grains, etc.).

To play this game all players first roll the dice. The highest roller plays first. He rolls each die separately. The first roll is charted on the vertical scale and the second roll is charted on the horizontal scale. At the intersection of the two, the player should place one of the tokens. Play then passes on to the next player.

The first player to chart a line of six tokens in a row (either vertically, horizontally or diagonally) wins the game.



Construct a graph on the color of eyes of all the students in your class



Graph the length of your various body parts in centimeters

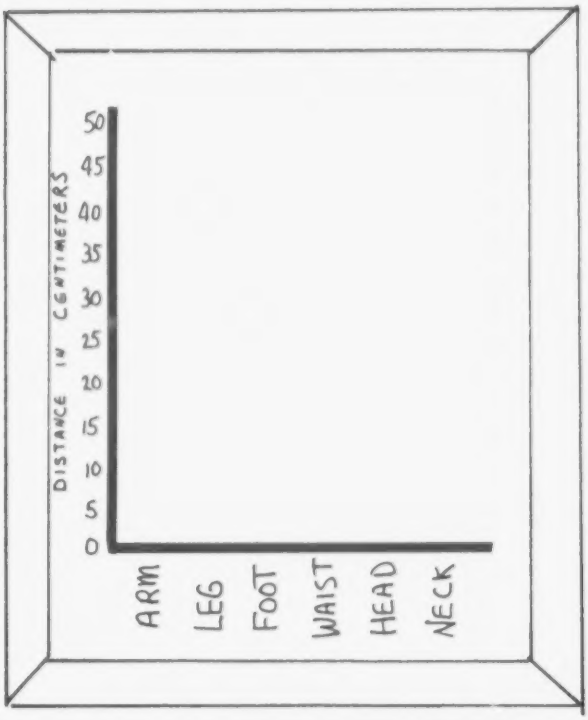
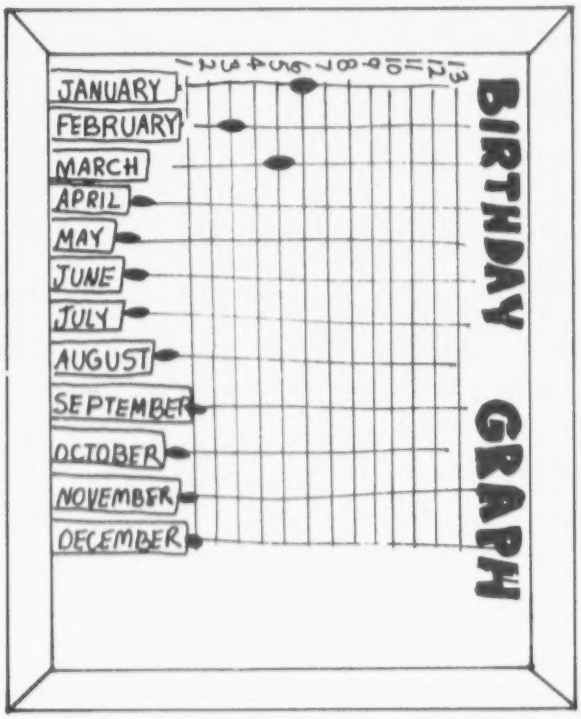
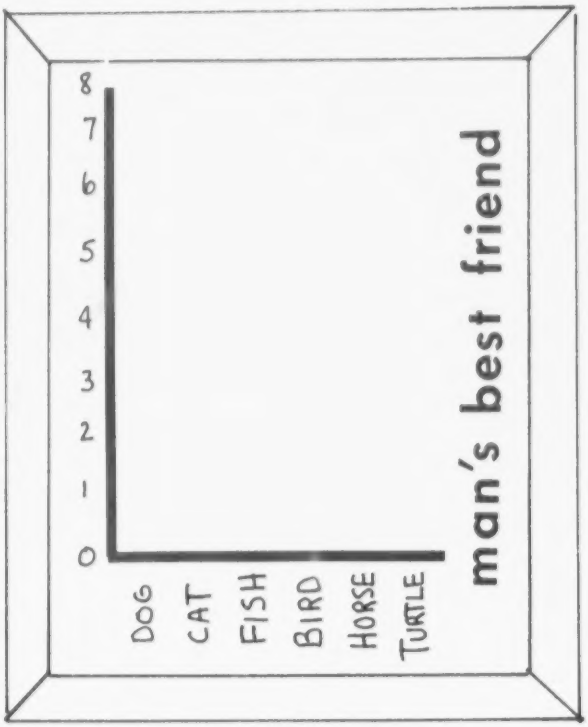


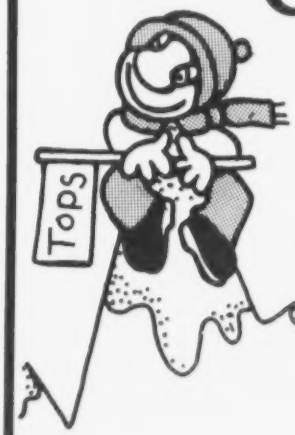
Chart the number of birthdays each month holds for the students in your class.



Survey 25 people who are not in your class on their favorite pet. Record their response on the chart below.



CONGRATULATIONS



YOU'VE REACHED THE TOP!

_____

(teacher)

YOU'RE A-O.K.!

_____

GOOD WORK!

_____

(teacher)

_____

_____

_____

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